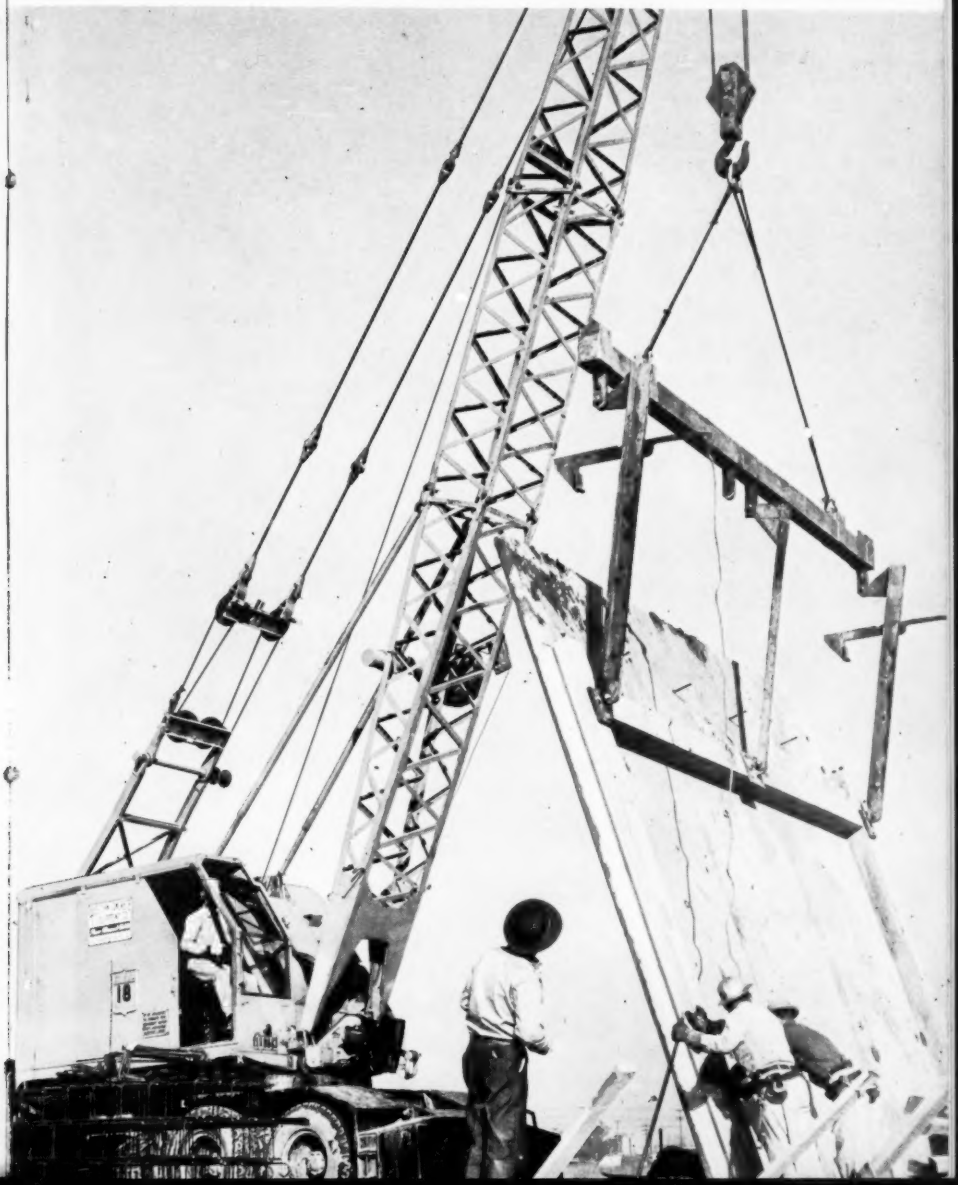
ACI News Letter

Vol. 21 No. 10 JOURNAL of the AMERICAN CONCRETE INSTITUTE June 1950



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ACI

News Letter Contents

June 1950

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Program plans formulated for Washington regional meeting

In and around Washington, D. C., which is more than a national capitol in harboring thought leaders in many lines, are some "grade A" concrete engineers. Some are identified with federal, state, district and local governmental agencies and private enterprise doing challenging things with concrete. They are the sources of a top-notch program for the Washington Regional Meeting, October 24-25, possibly the 26th—so promising are the subject events planned.

A. T. Goldbeck, ACI Vice-President who is Engineering Director, National Crushed Stone Assn., is program chairman for the event. He says there has been, as this issue goes to press, no final selection of papers and speakers.

The program committee has been offered so wide a choice that decision can't yet be made. Typical of the subjects suggested: lean mass concrete; effects of heavy loads on concrete pavements; the Chesapeake Bay Bridge; concrete in sanitation; research by the National Bureau of Standards and a panel discussion on ready-mixed concrete. The adopted program is scheduled for publication in the next JOURNAL—September.

Continued on p. 4

1951 Convention—Western Flavor

San Francisco (there is only one San Francisco) has been chosen as the scene of the 1951 ACI convention, to be held February 20-22, 1951, in the St. Francis Hotel.

Plans for a program which will be up to the professional standards of past ACI conventions have already gotten under way. The program will cover a wide field of developments in concrete design, construction, products and uses but will also have a western flavor, with appropriate emphasis on concrete developments in the west.

Named as general chairman is Harmer E. Davis, Director of the Institute of Transportation and Traffic Engineering, University of California, Berkeley. Subcommittee chairmen are as follows:

Continued on p. 4

ACI to list educational and commercial films on concrete

ACI is preparing a list of available educational and commercial motion picture films on concrete. It is hoped that the list when completed will be of sufficient value to warrant publication in the ACI JOURNAL as a service to ACI Members. The work is being initiated at the recommendation of a special Board of Direction committee on visual education, headed by Harmer E. Davis, as a starter to see what might be done in the way of ACI sponsored visual education.

It is known that there are many films available but ACI does not have data on them. Members can be of great help in bringing such films to ACI staff attention. If you know of a film, please write the Secretary-Treasurer giving the title or subject and where to write for detailed information. If you are connected with a laboratory, trade association, college, equipment or cement manufacturer or other company that owns a film or films which might be available, please furnish the following data regarding them:

> Title, a brief synopsis, minutes running time, size, sound or silent, color or black and white, terms of lending or rental and name of sponsor and owner or both.

Promptness in furnishing information will be doubly appreciated as it is hoped the first list can be published in the September JOURNAL. Data received by Aug. 15, 1950, can be included.

Washington Meeting

Continued from p. 3

E. W. Bauman, Managing Director, National Slag Assn., heads the regional meeting committee. Other committee members are: Frank B. Brown, Managing Director, Wire Reinforcement Institute, registration; A. N. Carter, Manager, Highway Division, Associated General Contractors, publicity; H. F. Clemmer, Engineer of Materials, District of Columbia, entertainment; J .E. Dunn, District Engineer, Portland Cement Assn., inspection trips; and S. S. Steinberg, Dean, College of Engineering, University of Maryland, educational contacts. ACI President Frank H. Jackson, Bureau of Public Roads, is serving as an ex officio member of the committee.

Washington is bent on meeting the pace set in Boston, Mass., 1949, and in Birmingham, Ala., 1947, with their regional conventions.

1951 Convention

Continued from p. 3

Local advisory on program development—J. W. Kelly, Professor of Civil Engineering, University of California, Berkeley.

Finance — A. G. Streblow, President, Basalt Rock Co., Napa, Calif.

Promotion and attendance—W. A. Marsh, General Manager, Permanente Cement Co., Oakland, Calif.

Publicity—J. I. Ballard, Editorial Director, Western Construction News, San Francisco.

Local arrangements—Lee J. Rothgery, Associate Engineer, Institute of Transportation and Traffic Engineering, University of California, Berkeley.

Exhibits and displays—Michael Goodman, Professor of Architecture, University of California, Berkeley.

Entertainment—J. E. Jellick, Manager, Portland Cement Information Bureau, San Francisco.

Who's Who This Month

Charles S. Whitney

Charles S. Whitney, consulting engineer, Ammann and Whitney, New York and Milwaukee, is the author of "Cost of Long-Span Concrete Shell Roofs," p. 765. Well-known to JOURNAL readers, Mr. Whitney was awarded the Wason Medal for most meritorious paper for his 1932 paper "Plain and Reinforced Concrete Arches" and has served on various ACI technical and administrative committees.

He was a member of the Board of Direction, 1945-46, and is at present chairman of Committee 312, Plain and Reinforced Concrete Arches, and a member of Committee 214, Evaluation of Results of Compression Tests of Field Concrete.

Twice awarded the Fuertes Graduate Medal by Cornell University, Mr. Whitney has also been honored with the J. James R. Croes Medal by A.S.C.E.

As a member of the partnership of Ammann and Whitney, he has been engaged in the design of buildings, airport facilities and bridges, including structures on the New Jersey Turnpike and expressways in Milwaukee, Wis. He received a C.E. degree from Cornell University in 1914 and his M.C.E. in 1915 from the same school. Following graduation, he held positions with Gustav Lindenthal; John Parkinson, architect; A. C. Eschweiler, architect; and Hool and Johnson, engineers. From 1922 to date he has been a consulting and designing engineer, specializing in city planning, design and supervision of buildings, bridges, sewer and water systems and other municipal improvements.

Mr. Whitney is also a member of numerous scientific and technical societies.

E. L. Howard

"Inspection of Ready-Mixed Concrete," p. 777, is another paper in the series on inspection of concrete, concrete construction and materials briefed at the 46th annual convention in Chicago. E. L. Howard, testing engineer, Pacific Coast Aggregates, Inc., San Francisco, Calif., has been associated with construction work from early childhood.

In 1933 he was employed by the U. S. Bureau of Reclamation in the concrete control division at Hoover Dam; he then went to Shasta Dam as an inspector in the same division. He left the Bureau in 1941 to join the Pacific Coast Aggregates, Inc., as assistant testing engineer.

A leave of absence was taken in 1943 to work as a junior testing engineer for the California State Highway Materials Laboratory. Mr. Howard returned to the Pacific Coast Aggregates' laboratory in San Francisco as testing engineer. He now directs the laboratory tests and control of all material produced by the company. Last year more than 1,000,000 cu yd of ready-mixed concrete were produced by the company which was inspected by the testing department; in addition, more than 5,000,000 tons of aggregates, produced from 18 plants, for concrete and road mixes were inspected by the department.

Mr. Howard, beside being an ACI Member, is a member of A.I.M.E., A.S.T.M. and S.A.M.E.

R. B. Young and W. Schnarr

R. B. Young and W. Schnarr, Assistant Director of Research and Concrete Control Engineer, respectively, Hydro-Electric Power Commission of Ontario, Toronto, Ont., Canada, submit "Summary of Inspection Practice," p. 785.

Mr. Young is well-known to JOURNAL readers as a past president of the Institute and author of numerous papers, the latest being "Concreting on the Ottawa River Projects of the Hydro-Electric Power Commission of Ontario," April, 1950. He

is also active on many ACI administrative and technical committees and has the enviable record of having attended every ACI convention since 1917.

He received the Wason Medal for "the most meritorious paper" for his 1937 paper "Concrete—Its Maintenance and Repair."

The research division of the Commission, of which Mr. Young is Assistant Director, is conducting applied research in many fields of science, chemistry, electricity, metals, mechanics and structures, including the inspection of concrete and soils structures.

Mr. Young has been actively interested in the studies of the durability of concrete in service as well as other fields including concrete control and inspection, winter concreting, construction, and maintenance and repair methods.

He was recently appointed chairman of the Committee on Concrete and Reinforced Concrete of the Canadian Standards Assn., which in its scope duplicates in a large part that of the Joint Committee of the same title. He was also one of the original organizers of the National Ready Mix Concrete Assn. and is now an honorary member of the organization.

Mr. Schnarr is also active in ACI affairs, being a member of Committees 604, Winter Concreting Methods, and 611, Inspection of Concrete, and co-author of several JOURNAL papers.

He has been with the Hydro-Electric Power Commission since 1917 and in 1918, under the direction of Mr. Young, was the first inspector to be sent out to a power project where the concrete was controlled and the water-cement theory was applied.

In 1930, as resident concrete engineer at the Chats Falls development, he helped organize the Commission's standard practice of placing concrete in high lifts by making one continuous section 65 ft high. At the Barret Chute development, he placed concrete 87 ft high with no construction joints; this section has shown no signs of stress or failure during the 19 years that it has been in service.

During the Commission's post-war expansion, Mr. Schnarr was appointed Engineer-in-Charge of the Concrete Control Dept., which position he now holds.

William Van Breemen, E. A. Finney and Thomas B. Pringle

Three members of Committee 325, Structural Design of Concrete Pavements for Highways and Airports, collaborate to present "Design and Construction of Joints in Concrete Pavements," p. 789.

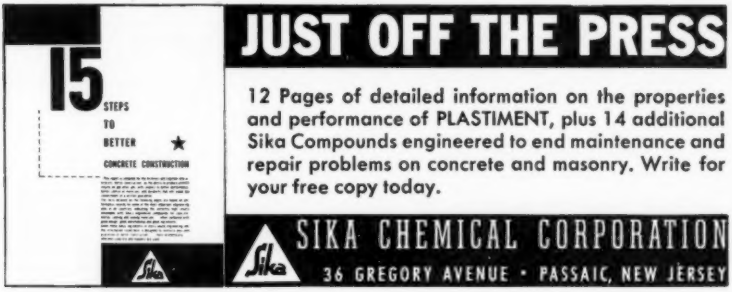
William Van Breemen, Engineer of Special Assignments—Research, New Jersey State Highway Dept., Trenton, N.J., has been associated with the New Jersey highway department since 1929 and is in charge of the department's Bureau of Research and Development. Prior to joining the organization he was engaged in railroad, sewer and oil pipe line construction, 1920-29.

Since 1931 Mr. Van Breemen has been engaged in making comprehensive investigations and tests in connection with the design, construction and performance of concrete pavements and joint devices, especially as related to pavements that carry large volumes of heavy truck traffic. He was actively associated with the development of white concrete reflecting curbs and the "singing" lane separator.

The author of several papers, Mr. Van Breemen is a member of several Highway Research Board committees and a member of the Rutgers University-New Jersey State Highway Dept. Joint Research Project.

E. A. Finney is Assistant Testing and Research Engineer in Charge of Research and Director of the Michigan State Highway Dept. Research Laboratory located at Michigan State College, East Lansing, Mich.

He graduated from Allegheny College with a B.S. in civil engineering in 1923 and received an M.S. in highway engineering from Iowa State College, 1925, and a professional degree in civil engineering from the same institution in 1934.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From 1925 to 1937 he served on the staff of the Civil Engineering Dept. and the Engineering Experiment Station at Michigan State College and joined the Michigan State Highway Dept. in 1937. In 1942 he became director of the department's research laboratory with the responsibility for a wide range of highway research projects pertaining to the design, construction, maintenance and operation of Michigan's trunkline system and allied projects. One of the laboratory's outstanding projects is the nationally known Michigan Test Road, which has been under continuous observation for the past 10 years.

Mr. Finney has been especially active in research associated with air-entraining concrete, concrete pavement design and performance, and concrete materials. Besides ACI, he is a member of A.S.C.E., Society for Experimental Stress Analysis, Michigan Engineering Society and many committees of the Highway Research Board.

Thomas B. Pringle, Office of the Chief of Engineers, Dept. of the Army, Washington, D.C., has been with the Corps of Engineers since 1942 where he has been responsible for the development of design criteria and construction procedures for airfields.

Graduating from Virginia Polytechnic Institute in 1926 with a B.S. in civil engineering, he was employed in railroad construction, 1926-32. He spent eight years in highway engineering, including maintenance and construction of concrete roads, and one year in factory construction before joining the Corps of Engineers.

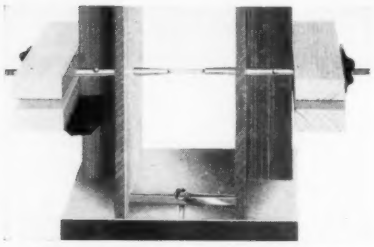
R. R. Clark

R. R. Clark, Head Engineer, Design Branch, Corps of Engineers, Portland, Ore., is the author of "Effects of High-Velocity Water on Bonneville Dam Concrete," p. 821. A member of ACI Committee 210, Resistance to Erosion in Hydraulic Structures, he is also the co-author of an earlier paper on Bonneville Dam in the January-February 1937 JOURNAL.

He graduated from Oregon State College in mining engineering, after which he completed civil and structural engineering training at Cornell University. He received the professional degree of civil engineer in 1938 at Oregon State College.

For 4 years he was in the employ of contracting firms engaged in building and bridge work; he has specialized in concrete and steel construction during 18 years of private practice as a civil and structural engineer.

Mr. Clark has been employed by the Corps of Engineers as a designing engineer on dams and related hydraulic structures for 16 years and is presently Head Engineer in charge of the Design Branch. Projects with which he has been associated in this capacity include Bonneville Dam, Fern Ridge Dam, Cottage Grove Dam, Dorena Dam, Detroit Dam, McNary Dam and Lookout Point Dam; all of these struc-



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tures are concrete or earth dams with concrete spillway and outlet structures.

He is a registered engineer in Oregon and California and a member of A.S.C.E., Society of American Military Engineers, Professional Engineers of Oregon and Tau Beta Pi.

C. D. Wailes, Jr.

"Precast Reinforced Concrete Structures," p. 841, is written by C. D. Wailes, Jr., President, C. D. Wailes Corp., Los Angeles, Calif.

After graduating in civil engineering in 1922, he became connected with the structural engineering firm of Gardner and Howe, Memphis, Tenn. In 1926 he joined the Dept. of Building and Safety, Long Beach, Calif., and assumed charge of the department in 1927. He was in charge of the department at the time of the 1933 earthquake and was afterwards connected with the repair and reconstruction of the damaged buildings.

For two years he was president of the Pacific Coast Building Officials' Conference and assisted in the development of the present building code of that area. From 1933-34 he served as a consulting engineer and from 1934-40 was the District Structural Engineer for Portland Cement Assn. During this time he assisted in the development of many types of precast construction systems, following their design and experimental work and field erection.

In 1941 the Wailes-Bageman Co. was formed, engaged in the manufacture and construction of precast concrete structures. At present he is president of the C. D. Wailes Corp., successor to the former company.

Mr. Wailes is a past president of the Structural Engineers Assn. of Southern California, past president of the Structural Engineers Assn. of California and a member of ACI and A.S.C.E.

Thor Germundsson

In "Prestressed Concrete Construction Procedures," p. 857, Thor Germundsson, Structural and Railways Bureau, Portland Cement Assn., Chicago, reviews various methods of prestressing and illustrates typical procedures. An ACI Member, he is active in the work of Committee 323, Prestressed Reinforced Concrete.

After graduation from the University of Copenhagen, he entered the University of Illinois as a Fellow of the American-Scandinavian Foundation. After working as a designer of steel and concrete structures for buildings and subways, he joined the staff of the Portland Cement Assn. in 1930. In the structural bureau of the association, he has collaborated in the preparation of books and reports in the field of design and analysis of reinforced concrete.

Whosit?

Institute headquarters recently received a change of address notice from Boston, Mass.; the card was not filled out. We hope our reader will let us know "whosit."

Honor Roll

February 1 to April 30, 1950

There is little change in the position of our top "Member-Getters" for the month ending April 30, 1950.

Prof. Newlin D. Morgan, University of Illinois, continues to lead with 34 credits. Leon Venegas, University of Louisiana, follows with 7 credits. Prof. E. I. Fiesenheiser, Illinois Institute of Technology, climbed up to tie with Prof. R. H. Sherlock, University of Michigan, for third place with 4½ credits each.

Newlin D. Morgan (Ill.).....34
Leon Venegas (La.).....7
E. I. Fiesenheiser (Ill.).....4½
R. H. Sherlock (Mich.).....4½
Henry E. Griset (N. C.).....4
Luis A. Pietri-Lavie (Venezuela).....3½
Ashby T. Gibbons, Jr. (Ga.).....3
Emil A. Gramstorff (Mass.).....3
Walter N. Handy (Ill.).....3
Chester P. Siess (Ill.).....3
George C. Alden (Calif.).....2½
H. J. Gilkey (Ia.).....2½
Melvin W. Jackson (Ga.).....2½
Cesar Oliver-Rugeles (Venezuela).....2½
Ralph L. Barbehenn (N. J.).....2
Roberto Barillas F. (Guatemala).....2
E. W. Bauman (D. C.).....2
Earl I. Brown (Ga.).....2
Clayton M. Crosier (Kans.).....2
Belmon U. Duvall (Ohio).....2
Frank H. Jackson (D. C.).....2
Wm. T. F. Hooper, Jr. (Ill.).....2
Stanley Moore (Canada).....2
S. J. Warberg (Mich.).....2
F. Thomas Collins (Calif.).....1½
Jacob J. Creskoff (D. C.).....1½
Raymond E. Davis (Calif.).....1½
Elmo C. Higginson (Colo.).....1½
Jose Antonio Vila (Cuba).....1½
Roderick B. Young (Canada).....1½
A. Amirikian (Md.).....1
Hugh Barnes (Calif.).....1
J. F. Baxter (N. Y.).....1
Hans H. Bleich (N. Y.).....1
E. F. J. Clark (Canada).....1
Sterling Lowe Bugg (Fla.).....1
W. Fisher Cassie (England).....1
Kenneth W. Clayton (Australia).....1
Harmer E. Davis (Calif.).....1
Raymond E. Davis, Jr. (Calif.).....1
Charles W. DeGroff (N. Y.).....1
DeWitt Dieterich (Ill.).....1
George W. Ford (Fla.).....1
William E. Gabelman (Calif.).....1
H. F. Gonnerman (Ill.).....1
Horace P. Hamlin (N. Y.).....1
Terrell R. Harper (Texas).....1
Charles E. Hawke (Canada).....1
M. D. Hicklin (Ore.).....1
Samuel Hobbs (Calif.).....1
Henry L. Kennedy (Mass.).....1
Thomas B. Kennedy (Miss.).....1
J. Sterling Kinney (N. Y.).....1
John C. King (Ohio).....1
R. A. Kirkpatrick (N. Y.).....1
George E. Large (Ohio).....1
Leo M. Legatski (Mich.).....1
Wm. Lerch (Ill.).....1
David V. Lewin (Ohio).....1
Harry E. Lewis (N. Y.).....1
Winthrop E. Luke (Mass.).....1
Glenway Maxon (Wis.).....1
James A. McCarthy (Ind.).....1
H. J. McGillivray (Fla.).....1
J. H. Murdough (Texas).....1
J. A. Murlin (Texas).....1
William D. Nowlin (Va.).....1
F. J. Ochoa U. (Guatemala).....1
Wm. Otcovsky (Ill.).....1
Kenneth K. Paget (Canada).....1
Stanley A. Phillip (Ill.).....1
Theodore O. Reyhner (Colo.).....1
Evan L. Richard (Australia).....1
Frank E. Richart (Ill.).....1
Horace B. Rickey, Jr. (La.).....1
Emil Schmid (N. J.).....1
Elwyn E. Seelye (N. Y.).....1
Howard Simpson (Mass.).....1
E. R. Smallhorn (Canada).....1
M. Eugene Sundt (N. M.).....1
Pascal L. Tasio (N. Y.).....1
A. G. Timms (D. C.).....1
Wm. H. Thoman (Colo.).....1
H. F. Thomson (Ill.).....1
LeRoy A. Thorssen (Canada).....1
F. E. Votaw (Mass.).....1
A. G. Watt (Pa.).....1
A. E. Wynn (S. Africa).....1
R. A. Zern (Pa.).....1

The following credits are, in each instance "50-50" with another member.

James Adam, Jr. — D. J. Cameron
Frederick G. Anderson — Julian B. Carson
Malcolm F. Baker — Anthony Henry Clark
C. Merrill Barber — Aloysius E. Cooke
George E. Barnes — William A. Crabb
A. Allan Bates — M. A. Craven
K. P. Billner — Charles W. De Groff
G. L. Blanchard — Harry Delzell
J. G. Bragg — R. G. Douglas, Jr.
R. A. Burmeister — W. J. Emmons

Continued on p. 21

Positions and Projects — ACI Members

Japan Society of C. E. representative visits ACI Headquarters

Makoto Tanetani, executive director and chief engineer of the Kajima Construction Co., Ltd., of Tokyo, made a brief visit to ACI headquarters May 5. On behalf of President Tokujiro Yoshida he brought the greetings and good wishes of the Japan Society of Civil Engineers to ACI.

Mr. Tanetani is making a three months visit to the United States to study late developments in concrete construction. His trip is sponsored by the Japanese government with the cooperation of the scientific and cultural development section, General MacArthur's headquarters.

Concrete conference at University of Michigan

The Second Annual Concrete Conference for Michigan was held at the University of Michigan in Ann Arbor on April 26 and 27, sponsored jointly by the Portland Cement Assn. and the University of Michigan, with the cooperation of the Michigan Society of Architects, the Michigan Chapters of the A.I.A., Michigan Section, A.S.C.E., and Associated General Contractors. The meeting was a successful continuation of a series begun at Michigan State College in December 1948.

About 150 registrants heard Ivan C. Crawford, Dean of the College of Engineering, introduce J. Gardner Martin of Lansing, District Engineer of the Portland Cement Assn., who explained the theme of the conference.

Forms

John H. Banker, Construction Consultant, PCA, Chicago, presented a paper entitled "Forms: Materials and Methods," discussing the many variables of this important subject—one of the largest items of cost of concrete in place. Mr. Banker reported that contact forms vary in cost from 20 cents to $1 per sq ft in various cities.

Curtis E. Bottum of the firm, Townsend and Bottum, Inc., Ann Arbor, led the discussion. He stated that not enough attention is being given to the cost of the finished product per cu yd of concrete. In most cases form costs are the largest proportion of finished concrete and records have shown that carpenter costs have doubled and labor costs have tripled on formwork. Concrete builders must find ways to reduce cost or be priced out of the market.

Harry Conrad, President and Chief Engineer of the Christman Co., Lansing, Mich., urged engineers and architects to study and apply the modular system to their plans for economy of formwork on construction. He suggested that engineering courses include a course in contracting.

Open discussion included the subjects of the use of form liners, special form materials and means of avoiding air bubbles on the surface of finished concrete.

E. B. Oberly, Construction Consultant, PCA, New York, spoke on exposed concrete. Historical data of interest were noted about early concrete buildings—the first of record being constructed and built in Wisconsin in 1844 by George Goodrich who had the cement hauled from New York by wagon train; the second concrete building was constructed by Horace Greeley in New York about 1852. It was a barn later rebuilt into a home and reported still to be in use.

Most important in getting acceptable exposed concrete surfaces is the matter of good forms. Following that are types of aggregates. Durability and water tightness can only be had with a good gradation. External vibration and external vibration plus spading are of high importance. Forms should always be clean.

There was some discussion of form pressures which have long been a matter

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Veterans Administration Hospital, Wilmington, Delaware, has a structural frame of Darex AEA concrete. Darex AEA made possible low slump concrete in heavily reinforced walls and slabs, with no appreciable honeycomb. *Photo courtesy U. S. Army Engineers.*

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of argument in design and for which there has not yet been established a standard. One important factor often overlooked by the form designer is that the temperature of the concrete has a pronounced effect on the resulting pressures.

Prestress

Herbert Stoll, Regional Structural Engineer, PCA, Chicago, spoke on prestressed concrete and described many structures built by this method.

F. N. Menefee, Professor of Engineering Mechanics, University of Michigan, led the discussion. He discussed many of the factors in prestressed design which are advocated by some of the European specialists but which are not yet wholly accepted in the United States.

A motion picture on prestressed concrete prepared by the Preload Corp. was shown.

At the Wednesday luncheon the conference was welcomed by James P. Adams, Provost of the University. Walter L. Couse, National President of Associated General Contractors of America was the principal speaker.

Messrs. Martin, Oberly, Stoll, Menefee and Couse are all ACI Members.

Floors

The second day of the conference was devoted to heavy duty floor construction. ACI Member R. H. Sherlock, Professor of Civil Engineering, introduced the subject at the morning assembly. Mr. Banker discussed the techniques and procedures required to build floors that will stand up under industrial traffic.

He stated that a dry mix should be used for heavy duty floor topping, as well as tough aggregates, good compaction and correct finishing. "Floors are abused more than anything else in a building."

He recommended granite or trap-rock aggregate rather than silicate for toughness, especially where steel-wheeled trucks were expected on the floor. He stated further that it was easier to get good compaction in a 1-in. floor topping than in a 2-in. topping.

Temperatures influence the construction of floors, Mr. Banker emphasized. The topping and the slab should be close to the same temperature during placement to prevent curling, cracking and improper bonding.

Too rich a mix is another fault often found in heavy duty topping as it not only causes bleeding and laitance on the surface but results in greater shrinkage. Using a "dryer" also gives too rich a mix on top of the floor.

He said that when cement finishers "slick" the surface, the impurities, laitance and fines come to the surface which gives a floor that will not stand up under heavy duty. The floor which has such a topping should be ground down to the good concrete and can be avoided by floating first and then slicking. He said that compaction using mechanical floats was necessary when using the dry mix for the heavy duty floor. Curing of floors is also abused he observed; wet curing is best although membrane curing and damp sand can also be used successfully.

In the discussion that followed, pros and cons were advanced for the construction of floors by the checkerboard system. It was emphasized that the water-cement ratio is more important than strength in floor specifications. For heavy duty floors, a mix not richer than 1:3 with 4 gal. of water per bag of cement was recommended.

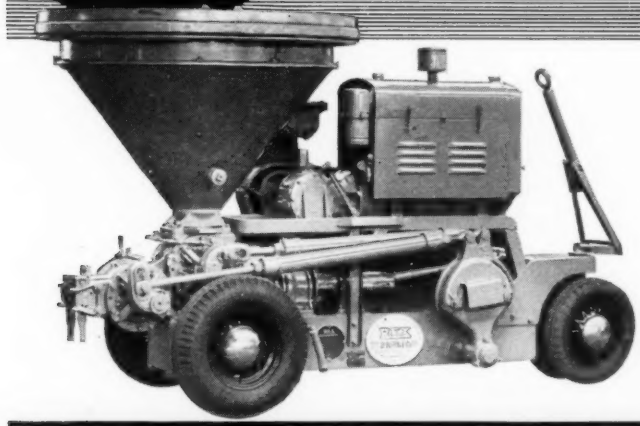
The mixing, placing and finishing of a heavy duty floor surface was demonstrated in the afternoon.

Corps of Engineers research engineer addresses Academy of Science

Bryant Mather of the Concrete Research Division, Waterways Experiment Station, Jackson, Miss., addressed the Earth Science Section of the Mississippi Academy of Science at its annual meeting held recently at Mississippi State College, Starkville, Miss.

The group consisted principally of geologists and geographers from Mississippi State College, the University of

REX PUMPCRETE



YOUR AUTOMATIC INSPECTOR OF CONCRETE QUALITY

Rex Pumpcrete . . . *the pump that pumps concrete through a pipe line* . . . is an *automatic inspector* that inspects the quality of every batch of concrete pumped to the forms.

FIRST. Where segregation of the batch has occurred through mishandling or unsatisfactory mixing, the remixing hopper of the Pumpcrete will automatically correct this condition, assuring highest quality concrete.

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THIRD. The piston and valves of the Pumpcrete form the plastic concrete into cylinders which are placed in the sealed pipe line and pumped directly to the forms. There is no chance for segregation of the concrete during travel through the *sealed* pipe line. Concrete arrives at the forms in the same unsegregated, high quality condition as it was when it entered the pipe line.

For highest quality concrete . . . for automatic inspection of concrete quality, rely on Rex Pumpcrete. For the complete story, write Chain Belt Company, 1713 W. Bruce Street, Milwaukee 4, Wis.

CHAIN BELT REX COMPANY CONSTRUCTION MACHINERY

Mississippi, Millsaps College, and the Mississippi Geological Survey.

Mr. Mather discussed chert and pointed out that both from the standpoint of the geologists and the concrete research engineer there were many important unsolved problems concerning the composition, origin and use of chert even though this was one of the most common and widespread materials in the gravel deposits of the southeastern states, as well as in large portions of many other states.

He stated that as part of the Civil Works Investigations of the Corps of Engineers an intensive study is being made of various chert gravels in an effort to explain why some concrete made with chert aggregate gave unsatisfactory service while other concrete made with apparently similar chert has given excellent service.

It is anticipated that as a result of this investigation the Corps of Engineers will be able to develop tests that will permit the making of high quality concrete from certain low-cost chert aggregates which would under presently available testing procedures be regarded as unsatisfactory. If successful, a considerable saving in cost of materials for concrete construction will be realized.

Mein on advisory council

William Wallace Mein, Jr., vice-president of Calaveras Cement Co., San Francisco, Calif., has been appointed to membership on the National Minerals Advisory Council by Secretary of the Interior Oscar L. Chapman. Mr. Mein, an ACI Member, has been secretary of the California State Mining Board since 1944 and is western vice-chairman of the Industrial Minerals Division of the American Institute of Mining and Metallurgical Engineers.

Poul Giersing

Poul Giersing, formerly production manager, Tunnel Portland Cement Co., Ltd., England, is now a civil engineer with Cement-Jern Konsortiet, Denmark.

Butler retires

C. M. Butler, ACI Member since 1924, has retired as Chemical Engineer, Marquette Cement Manufacturing Co., Oglesby, Ill., after more than 30 years of service with the company at the Oglesby plant.

Straub accepts appointment

Lorenz G. Straub, director of the University of Minnesota's St. Anthony Falls Hydraulic Laboratory, has accepted an appointment as civilian member of the Beach Erosion Board of the Corps of Engineers for a 4-year period. Dr. Straub is head of the department of civil engineering at the university and engineering consultant to the Division of Waterways of the Minnesota Dept. of Conservation.

Hendrickson joins pipe association staff

John G. Hendrickson, assistant professor in civil engineering, Princeton University, will join the staff of the American Concrete Pipe Assn. and the American Concrete Pressure Pipe Assn. as a research engineer in July.

Following his graduation from Princeton with a B.S. in civil engineering in 1939, he was associated with the American Bridge Co. He returned to Princeton as an instructor in engineering drawing and elementary surveying. Entering the Civil Engineer Corps of the U. S. Navy in 1943, he saw three years service as an officer of an underwater demolition team. He returned to Princeton in 1946 as an instructor in civil engineering.

Besides being a member of ACI, he is a member of A.S.C.E. and the Society of American Military Engineers.

A.S.T.M. to meet in Atlantic City

Technical sessions, committee meetings and apparatus and photographic exhibits will be featured at the A.S.T.M. 53rd annual meeting in Atlantic City June 26-30.

THE NEW **BALDWIN** 300,000 lb. CONCRETE TESTING MACHINE IS DOUBLY GOOD

PUMPING AND WEIGHING UNIT

LOADING UNIT

Here's the latest Baldwin Concrete Testing machine, which has the desirable features of previous models, plus important improvements, all combined in a new functional design. The weighing unit is housed in a metal cabinet with hand wheel and push-button controls and two precision Emery hydraulic dial indicators with auxiliary pacing discs. It is completely separate from the loading unit, and can be located at any convenient distance from it. Machine accommodates 3" x 6", 6" x 12" and 8" x 16" concrete cylinders, and can be equipped to accommodate 12" x 18" building blocks when specified. Features include:

- Capacity: 300,000 lbs. in 500 lb. divisions: 50,000 lbs. in 100 lb. divisions. Automatic switch protects low range.
- Clearances: 18½" clear space between columns: 26⅝" between ram and upper platen; 10" ram travel.
- Accuracy: 1% of reading or 0.2% of range—whichever is greater.

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The Baldwin Locomotive Works, Philadelphia 42, Pa., U. S. A. Offices: Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh, San Francisco, St. Louis, Washington. In Canada: Peacock Bros., Ltd., Montreal, Quebec.

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BALDWIN

TESTING HEADQUARTERS

5812

PCA dedicates new laboratory

The Portland Cement Assn. dedicated its $3,000,000 Research and Development Laboratories in Skokie, Ill., June 8 in the presence of about 400 guests from near and far including many noted ACI members. During ACI's 46th annual convention in Chicago in February, some ACI Members took a "preview tour" through the new laboratories which are the largest and most completely equipped in the world devoted exclusively to research on cement and concrete.

Providing approximately 98,000 sq ft of usable floor space, the laboratory group consists of two architectural concrete buildings joined by a covered walkway. They were built to replace and increase threefold the association's former research facilities at its general headquarters, 33 West Grand Ave. in Chicago. The main laboratory building is a two-story structure with penthouse and basement; the auxiliary building is one story without basement.

The auxiliary building will provide space for storage and for processing operations, some of which require high temperatures and relatively heavy or dust-raising industrial machinery. It is provided with overhead cranes and other special services, and has dust collecting equipment on its roof.

The main building is designed to house the offices and laboratories of the various research and development sections and their related temperature, humidity, chemical and physical testing rooms. There, too, are conference and reading rooms, a library and cafeteria, a drafting room and clerical spaces.

Architectural features

A clean-lined appearance was gained in both laboratory buildings by taking full advantage of the decorative as well as structural qualities of concrete.

Reeded architectural concrete piers separate the large window openings. In the main building these piers are 8 in. thick and were cast in plaster molds. They are set back 3 in. from 11-in. exterior walls and spandrel beams, and sharp horizontal lines are thus produced.

A pleasing texture and color was obtained on exterior concrete walls by use of center-matched Oregon fir form boards, and by a grout cleandown. The form boards left distinctive grain markings and a texture that is neither too smooth nor too rough. The grout used in the clean-down contained some white portland cement for light color and was applied with a stiff bristle brush and worked into the voids with a cork float. The excess was removed by rubbing with burlap, so that there is no film sheen.

Interior walls have several finishes. Nearly all walls in the auxiliary building and in the basement of the main building are cast-in-place concrete left exposed. Most of the interior partition walls in the main building are of concrete masonry. Some of these were left unpainted, and others, particularly office, lobby, auditorium and corridor walls, were finished

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in a variety of attractive colors. Those laboratories in which the humidity is controlled have their walls covered with a bituminous seal coat and two coats of aluminum asphalt base paint. The walls of the cafeteria kitchen and moist rooms are finished with portland cement plaster. Cast stone was used effectively in the lobby, front stairway and toilet and shower rooms.

Engineering features

Both of the structures are wall bearing. The engineering design is one-way and two-way slab-to-girder, with the girders kept wide and shallow for headroom, good ceiling effect and free run to ventilating ducts. The auxiliary building was designed for spread footings; the main building for concrete piles.

In construction of the main building, a total of 530 piles with an average length of 35 ft were driven; 27 piles were required to support the 262 cu yd articulated concrete base for the 1,000,000-lb compression testing machine.

A total of 502 tons of improved deformed bars complying with current A.S.T.M. specifications was used. Typical wall steel for the buildings consists of two rows of ½-in. round bars on 12-in. centers in both directions. Temperature steel in slabs consists of ½-in. round bars on 12-in. centers at right angles to the main steel. Slab reinforcing steel was usually supported by chairs, except where the appearance of the underside was important, as in the entrance canopy. In such cases it was supported from above.

An arbitrary rule was set up to provide control joints at least every 22 ft in all walls; in most instances they occur at shorter intervals. On exterior walls, rustication lines were provided for this purpose, as well as for decorative effect, and to permit use of form panels which could be moved manually. The vertical rustication lines were spaced to permit the forming between panels of continuous control joints from bottom to top of the structure. The horizontal rustication lines were spaced so that the panels could be moved from lower to higher lifts and reused after only slight alterations were made in height.

The height of form panels varied from 6 to 10 ft, and the width from 8 to 16 ft. In their construction 1 x 8 in. center-matched Oregon fir boards were nailed to 2 x 4-in. vertical studs on 16-in. centers. The use of center-matched boards enabled the carpenters to select the better side for the face of the forms, and in some instances to reverse the boards in the forms for longer use. To permit easier stripping of the forms, to reduce shrinkage and prolong the life of the boards, all form lumber was dipped in emulsified stearate before use. Before reuse, the forms were cleaned and again coated by means of rags or brushes dipped in the stearate.

In interior walls in the main building, control joints were placed at the sides of columns which occurred approximately every 20 ft, so as to separate the columns from the walls. Block facing was anchored to the columns to bring them flush with the adjoining masonry walls.

An interesting practice was the use of ceiling anchorages to give lateral stability to concrete masonry walls. A series of 2½ x 1-in. 14-gage steel angles were fastened to the ceiling by means of a nail type anchor set by a power-driven fastening tool.

Columns and piers

The wall bearing design of the buildings called for placing of spandrel beams integrally with floor slabs. It was realized that the intersecting of deck and spandrel steel would make it all but impossible to place concrete of a stiff consistency in the

piers and interior columns below. For this reason, all interior columns and piers were placed before deck and spandrel steel was set. This practice, in addition to facilitating placing operations, eliminated the tedious job of cleaning around deck reinforcing steel, as it was not yet assembled when the concrete was being delivered to pier and column forms.

All interior columns are square or rectangular, and were formed with ¾ in. plywood. There are, in addition, six exterior round columns. Three support the general analytical chemistry laboratory and corridor between the west and central wings of the main building, and three support the concrete slab canopy connecting the main and auxiliary buildings. The columns supporting the general analytical chemistry laboratory and corridor were cast in conventional steel forms, but the three supporting the slab canopy were cast in paper tubes. These paper tubes were strong and rigid enough to permit the casting of 16-ft columns without lateral bracing.

Floor finishes

The floor slabs of working areas in both buildings have a concrete topping containing traprock coarse aggregate. In the auxiliary building where the floors were placed in one course, traprock screenings were spread on the surface and worked in with power floats. In the main laboratory building, where two course floors were used throughout, the procedure was different. A cement-sand grout was first spread, then traprock concrete of thick consistency applied. It was tamped, rolled by hand and power floated to an even surface, approximately 1 in. thick, then finished with troweling machines. It produced 12,000-lb concrete in 28 days.

Charles F. Kettering of General Motors was main speaker at the dedication; Frank T. Sheets, president of PCA, spoke on "The Mission of PCA" and A. Allan Bates, vice-president in charge of research and development, spoke on "Research and Reality."

HERE ARE THE FACTS

About the Use of CALCIUM CHLORIDE in Concrete

"The Effects of Calcium Chloride on Portland Cement" is a 40-page semi-technical book that tells you the facts about the use of Calcium Chloride in concrete. It describes in detail the carefully controlled tests that have been conducted by recognized authorities in the field and in the laboratory . . . and the results obtained.

Valuable Information For Contractors, Architects, Engineers, Plant Operators

Everybody who works with concrete—directly or indirectly—will be interested in this book. It gives factual answers to such questions as . . .

- What happens when Calcium Chloride is added to air entrained cement? . . . to high early cement? . . . to low heat cement? . . . to colored cement?
- What are the effects of Calcium Chloride on slump? . . . on flow? . . . on workability? . . . on density? . . . on water-cement ratio?
- What are the effects on setting time? . . . on early strength? . . . on ultimate strength?
- What are the effects on volume change and on surface wear?
- How much will Calcium Chloride reduce the curing period?
- What will Calcium Chloride do for cool and cold weather concrete?

These are just a few of the questions answered in "The Effects of Calcium Chloride on Portland Cement." In addition, there are graphs, tables, charts and much material that is now available for the first time in this book.

FREE COPIES AVAILABLE ON REQUEST

"The Effects of Calcium Chloride on Portland Cement" is being made available without any cost or obligation by the Solvay organization. For your free copy, simply write on your business letterhead to Dept. JC-6, Solvay Sales Division, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N. Y. Editions are limited, so rush your request now.

SOLVAY
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For Better Concrete

New Members

Of the 50 applications approved for membership for the month of April there were 31 Individual, 2 Corporation, 1 Junior and 16 Student.

Top membership state for the month, providing 5 new Members, was Ohio with Illinois close behind with 4 new applicants.

The membership total April 30, 1950 became 5076.

California

Bigelow, Frank O., (Indiv.) 1052 Ravendale Rd., San Gabriel, Calif.

Colorado

Wilder, Carl R., (Indiv.) Engineer, Conservation Bureau, Portland Cement Association, Denver, Colo.

District of Columbia

Howat, Yvone Kirkpatrick, (Indiv.) c/o Howat Concrete Co., Inc., 2 "S" St., S. W., Washington 4, D. C.

Florida

Allen, A. D. Jr., (Indiv.) P. O. Box 371, Jacksonville 1, Fla.

Brady, David H., (St.) 816 Kanuga Drive, W. Palm Beach, Fla.

Grunert, Joseph F., (Indiv.) 1526 N. W. 2nd St., Miami 35, Fla.

Georgia

Armenakas, Anthony Emmanuel, (St.) Box 4779, Ga. Institute of Technology, Atlanta, Ga.

Tucker, Thomas W., (St.) 315 1st Ave. S. W., Moultrie, Ga.

Illinois

Eidinger, Ernst, (Indiv.) 7225 Langley Ave., Chicago 19, Ill.

Greenbaum, Robert B., (St.) 7321 S. Shore Dr., Chicago 49, Ill.

Schwendener, Paul H., Jr., (Indiv.) 740 S. Ashland Ave., LaGrange, Ill.

U. S. Navy, (Corp.) District Public Works Officer, Building 1-A, Great Lakes, Ill. (Cdr. Madison Nichols)

Iowa

Yanes, Adolfo, (St.) Quad Cott 29, Iowa City, Ia.

Louisiana

Bryie, Richard D., (Indiv.) 809 N. Fourth St., W. Monroe, La.

Maine

Simpson, Charles P., (Jr.) Seal Harbor, Maine

Maryland

Howat, P. Y. K., (Indiv.) 6314 Connecticut Ave., Chevy Chase 15, Md.

Massachusetts

Morrison, Ruben, (St.) 108 Homestead St., Roxbury 21, Mass.

Michigan

Calkins, Paul S., (Indiv.) 23230 Power Rd., Farmington, Mich.

Missouri

Loman, William L., (St.) 3829 Cleveland, Kansas City, Mo.

New Jersey

Sherman, Frank R., (Indiv.) 508 North St., Teaneck, N. J.

Weymouth, Laurence E., (Indiv.) Johns-Manville Research Center, Manville, N. J.

New York

Kinloch, Alfred M., (St.) Church No. 1, Rensselaer Polytechnic Institute, Troy, N. Y.

North Carolina

Key, Lester L., (St.) 1816 13th Ave., Hickory, N. C.

Stephens, John Mack, (St.) Box 3605, State College Station, Raleigh, N. C.

Ohio

Huff, William Boyd, (Indiv.) 1050 N. Main St., Akron 10, Ohio

Lienesch, Theodore R., (Indiv.) 219 Beverly Place, Dayton 9, Ohio

Moorhead, Robert E., (St.) 86 S. Powell Ave., Columbus 4, Ohio

Schmid, D. M., (Indiv.) Assistant Sales Manager, Truscon Steel Co., Youngstown 1, Ohio

Stofle, Robert F., (Indiv.) 2438 Beekman St., Cincinnati, Ohio

Oklahoma

Quirk, Willard R., (Indiv.) School of Civil Engineering, Oklahoma A & M College, Stillwater, Okla.

Pennsylvania

Mohr, C. F., (Indiv.) 100 Bonsal Ave., Aldan, Clifton Heights, Pa.

South Carolina

Dotterer, E. Gaillard, (Indiv.) c/o Dotterer Engineering Co., P. O. Box 495, Charleston, S. C.

South Dakota

Johnston, Robert A., (St.) 820 Ninth Ave., Brookings, S. D.

Tennessee

Fitzgerald, John A., Jr., (St.) 759 E. Chester St., Jackson, Tenn.

Texas

Anderson, Myron C., (Indiv.) 3350 Old Spanish Trail, Houston, Texas

Virginia

Crane, Leo Stanley, (Indiv.) Engineer of Tests, Southern Railway Laboratory, P. O. Box 233, Alexandria, Va.

Goodman, Richard C., (Indiv.) P. O. Box 1778, Norfolk, Va.

Wyoming

Sturdevant, J. E., (Indiv.) P. O. Box No. 214, Casper Wyo.

Hawaii

Char, Washington T., (St.) 2154 Eheu St., Honolulu, T. H.

Ireton, John Chaney, (Indiv.) 319 Kalama St., Lanikai, Oahu, Hawaii

Canada

Dick, Donald David, (Indiv.) General Delivery, Powell River, B. C., Canada

O'Brien, Michael Joseph, (Indiv.) c/o Truscon Steel Co. of Canada, Ltd., 13 d'Aiguillon Place, Quebec, P. Q., Canada

Sadler, Wilfred Robertson, (Indiv.) c/o Alberta Transit Mix Concrete Co., Ltd., 502 11th Ave. E., Calgary, Alberta, Canada

England

Carey, Robert, (Indiv.) c/o Sir William Halerow & Partners, Alliance House, Caxton St., Westminster, London S. W. 1, England

MacLean, Graham, (Indiv.) c/o Dewey & Almy Ltd., Elveden Road, Park Royal, London N. W. 10, England

India

Thillainayagam, R., (Indiv.) 4 Annamalai Puram, Tennur P. O., Tiruchiradalli, South India, India

Lebanon

Ward, Earl Burton, (Indiv.) Trans-Arabian Pipe Line Co., P. O. Box 1348, Beirut, Lebanon

Venezuela

Arismendi-Ayala, Pedro A., (St.) 76 Ave. Las Acacias, La Florida, Caracas, Venezuela

Facultad De Ciencias Fisicas y Matematicas, (Corp.) Ciudad Universitaria, Caracas, Venezuela (Rafael De Leon)

Yarnoz, Maria Carmen, (St.) Avenida La Vega, Edificio Loird—Ap. No. 3, El Paraiso, Caracas, Venezuela

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Honor Roll

Continued from p. 9

Phil M. Ferguson
Jorge Figuls
A. T. Goldbeck
O. H. Gosswein
Alex H. Graves
Homer M. Hadley
William H. Hall
George E. Hatch
John M. Hayes
Raja A. Iliya
W. R. Ingram
C. E. Ireland
Frank Kerekes
W. D. Kimmel
Ralph W. Kluge
Blas Lamberti
J. E. Lothers
Irvin H. Luke
Ian Macallen
M. F. Macnaughton
A. J. McElrath
Harmon S. Meissner
J. Neil Mustard
Raymond G. Osborne
John P. Ottesen
Henry Pfisterer
Chesley J. Posey
Leo F. Pratt
Paul Rogers
Charles S. Rippon
A. Rodriguez-Delfino
William H. Rowan
John A. Ruhling
Fredric Rusche
Nicholas R. Samaha
R. W. Sauer
Wilfrid Schnarr
J. Morgan Smith
John J. Stedje
L. W. Teller
George P. Thigpen
J. Neils Thompson
B. K. Thornley, Jr.
John H. Thornton
E. W. Thorson
G. E. Troxell
Paul M. Trueblood
Lewis H. Tuthill
Miguel Villa
Julius J. Warner
Willard W. Warzyn
Clement T. Wiskocil
Bourdette R. Wood
H. D. Worthington

Tools, Materials, Services

Under this heading note will be made from time to time of producer literature of presumed technical interest (and available from its source for the asking) to ACI users of tools, equipment, materials, accessories and special services.

Compressibility charts

Bulletin P-7637, "Compressibility Charts and Their Application to Problems Involving Pressure-Volume-Energy Relation for Real Gases," recently released by Worthington Pump and Machinery Corp., presents a series of compressibility charts covering the pressure-temperature range usually encountered in engineering practice. They are especially complete at low values of reduced pressure.

Formulas are also developed applicable to gases that do not follow the perfect gas laws, in which compressibility factors shown on the charts may be used for estimating compressor horsepower and limiting throat pressures and weight flows for nozzles.

Copies are available from Research Laboratory, Worthington Pump and Machinery Corp., Harrison, N. J.

Spherical tank

The development of a concrete underground spherical tank for fuel oil storage has been announced by Consperes Co. The spherical form of the Consphere tank is a one-piece monolithic structure having no seams other than the cover at the top of the tank. The manufacturer states that this one-piece construction was developed for maximum strength against external earth pressure.

The 600-gal. tank is molded in steel forms. After form removal, the tanks are cured by filling with water. After the curing period, the tanks are drained and coated inside with a petroleum-resistant lining.

Further information is obtainable from Consperes Co., P. O. Box 815, Springdale, Conn.

Screed supports

Screed supports for all conditions of light or heavy screeding are described in a 4-page bulletin issued by the Richmond Screw Anchor Co., Inc. Items described include an offset screed head to hold either 1-in. I.D. pipe or a 1¼ x 1¼ x ⅛-in. T-bar and brackets, bases and chairs used with screed, form and curb supports.

Copies may be obtained from Richmond Screw Anchor Co., Inc., 816-838 Liberty Ave., Brooklyn 8, N. Y.

Sliding forms for silos

Portable sliding form equipment for building farm silos is described in a pamphlet published by B. M. Heede, Inc. Transportable on one 2½-ton truck, the equipment is claimed to be capable of completing, with a crew of 4 men, one 16½ x 40-ft silo in four working days.

Further information may be obtained from B. M. Heede, Inc., 80 Broad St., New York 4, N. Y.

Transit mixers

Chain Belt Co. recently published a bulletin illustrating and describing Rex Horizontal Moto-Mixers and the new Rex Adjusta-Hite Discharge Moto-Mixers.

This 16-page bulletin gives detailed descriptions of the features of the two mixers and cut-away views, job illustrations and dimensional drawings show these features in operation. A complete table of specifications and mounting dimensions for all sizes of both Moto-Mixers is included.

For a copy of Bulletin 50-10, write Chain Belt Co., 1600 West Bruce Street, Milwaukee 4, Wis.

Vibratory subgrader

The latest model of the Blaw-Knox vibratory subgrader can be used for road widths from 20 to 25 ft and features a cross-over bridge for batch trucks. The machine applies a vibratory force of 2000 impulses per minute to the forward edge of the cutting blades. A method of insulation and control directs the vibrations into the ground without transmitting shock or movement into the road forms.

The machine's cutting blades and strike-off are quickly adjusted for crown. The warping of the subgrade from flat to crown, or the reverse, can be accomplished without stopping the forward motion of the subgrader. Batch trucks can traverse the pass-over while the machine is in motion.

Further information can be obtained from Blaw-Knox Division of Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Automatic water system for pavers

A fully automatic, hydraulically controlled water system as standard equipment on Worthington-Ransome 34E dual drum pavers, is announced by the Ransome Division of Worthington Pump and Machinery Corp. The system is designed to simplify operation of the machine and to assure a more uniform mix. The manufacturer says the possibility of wet or dry batches due to carelessness is eliminated.

The automatic system goes into operation when the skip is approximately 4 ft off the ground, and closes the water valves completely when the required water has entered the drum. An automatic water cutoff delaying action, adjustable to a maximum of 12 seconds, eliminates the need for the paver operator to hold the skip up until the proper quantity of water has been discharged.

For further information write Ransome Division of Worthington Pump and Machinery Corp., Dunellen, N. J.

Strain indicator

A new Type "L" portable, battery-powered strain indicator for use with SR-4 bonded resistance wire strain gages has been announced by the

Baldwin Locomotive Works, Philadelphia 42, Pa. The instrument is a refinement of Baldwin's Type "K" instrument with several new features.

Four major improvements have been made in this direct reading instrument. First, the ten "Thousands" steps are increased from 1000 to 2000 micro-in. per in. per step, giving a total of 20,000 micro-in. per in.

Second, the range extender has been increased from an approximate 10,000 micro-in. to a more exact 20,000 micro-in. with an accuracy of ± 50 micro-in. This change extends the balancing range of the instrument to ± 30,000 micro-in., which is broad enough to cover all practical applications of SR-4 strain gages. The broader range of this instrument permits measurements in the plastic range of metals and balancing the bridge when dummy gages are unusually far off balance.

Third, the new model can be used with a completely external Wheatstone bridge circuit without modifying the internal circuit. The fourth change is provision of an oscilloscope connector jack for applications in rephasing problems sometimes encountered when using extremely long leads (50 to 100 ft) between SR-4 strain gages and the instrument. The instrument is designed and calibrated for 120-ohm gages with gage factors of 1.77 to 2.20. However, gages of other resistances and gage factors may be used if necessary.

Further information can be obtained from Baldwin Locomotive Works, Philadelphia 42, Pa.

Removal of mold cores

A technical information bulletin, CS 248, describing the use of hydraulic actuating cylinders for the removal of mold cores from fresh concrete pipe during production has been released by Ledeen Mfg. Co. The core removal is described and illustrated. Copies of Bulletin CS 248 may be obtained from Ledeen Mfg. Co., 1600 S. San Pedro St., Los Angeles 15, Calif.

Waterproofing admixture

A leaflet issued by Evode Ltd., England, describes a waterproofing admixture, Evode Mellitol, and tabulates the requirements and costs for various types of jobs. Test results and mixing directions are included. For further information, write Evode Limited, Glover Street, Stafford, England.

Preventing acid erosion

A 4-page folder published by Evode Ltd., England, presents details on Evode Prover II and V, hardening treatments for concrete floors. The manufacturer states that the compound eliminates dusting and resists the erosive action of oils, lactic and acetic acids, etc. Copies may be obtained from Evode Limited, Glover Street, Stafford, England.

Balloon forms

An experimental concrete house being built in Van Nuys, Calif., will use a Fiberglass balloon as the form for the concrete roof.

After placing conventional type footings, the reinforcing, plumbing and window and door frames are placed against the steel outside wall forms. Wire mesh is then placed on the forms and tied to vertical ½-in. bars so that it will be held in the center of the 4-in. wall. Electric conduit is placed in the usual manner. Using the Conair gun, the concrete is pneumatically placed from the inside of the building to an outside wall thickness of 4 in. Inside partitions are constructed in the same manner but are 3 in. thick.

The Fiberglass balloon is secured to the outer edge of the steel forms and inflated to be used as forming for the roof. The concrete is sprayed against the balloon from the outside of the building.

Detailed information can be obtained from Conair Sales, Inc., 12147 Riverside Drive, North Hollywood, Calif.

Waterproofing structures

Two new folders released by Prufcoat Laboratories describe waterproofing compounds for controlling water seepage and dampness on brick, concrete, cement plaster, stucco and concrete masonry surfaces. Engineering test reports and questions and answers about the use of Pruftite compounds are included. Copies can be obtained from Prufcoat Laboratories, Inc., 63 Main Street, Cambridge 42, Mass.

Mixer

A new portable multi-blade mixer has been introduced by the Multiplex Machinery Corp. This mobile machine is being produced primarily for mason contractors, plasterers and the road building industry. Power for the mixer is provided by either electric motor, gas or diesel engine. A discharge door is located at a height to permit use of a standard wheel barrow, which the manufacturer claims eliminates the necessity for special platforms, rigs, etc. Replaceable liners and paddles of high carbon steel are said to reduce maintenance problems. The Multico Mixer is of minimum width to permit passage through narrow doors and aisles and is produced in 3, 5, 7 and 12 cu ft capacities. For further information write Multiplex Machinery Corp., Elmore, Ohio.

Concrete inserts

The 4-page Bulletin CI-2, published by Unistrut Products Co., describes and illustrates the new Unistrut concrete insert. The manufacturer claims that the patented Unistrut features permit attachment of fittings at any point along the entire insert face without disturbing attachments previously made. The bulletin describes a method of making inserts from short pieces of Unistrut channel and anchor-type drive-in end caps. Complete specifications and ordering information are included. The bulletin is available from Unistrut Products Co., 1013 W. Washington Blvd., Chicago 7, Ill.

Meter for batching operations

A new Auto-Stop meter which, the manufacturer claims, will automatically control the quantity of water used for concrete batches has been announced by Neptune Meter Co. The Auto-Stop meter consists of a register mounted on a Neptune liquid meter coupled with a quick-closing valve. This meter, inserted in the line near the mixing equipment, will automatically shut off the flow after a predetermined quantity has been delivered.

The tripping mechanism is set by pushing buttons on the register until the number of gallons (or pounds) desired shows up on the numeral wheels. The valve is then opened and the Auto-Stop tripping device automatically cuts off the flow when the exact quantity is delivered. Large numerals on the face of the meter keep pace with the flow and provide a visual check when the delivery is finished. A small shuttered totalizer near the top of the register keeps cumulative totals, from which daily, weekly, or monthly figures can be recorded.

Further information can be obtained from Neptune Meter Co., 50 West 50th Street, New Yotk 20, N. Y.

Air-entraining cement—pictorial record

Just published by Universal Atlas Cement Co., a 20-page commenorative booklet, "A Decade of Atlas Duraplastic," traces the 1939-1949 period of the origin, development and use of Duraplastic air-entraining cement.

The booklet describes how Duraplastic was developed originally to solve the problem of concrete pavement scaling due to the use of de-icing salts; how its use has extended from pavement concrete to a wide variety of structural and mass concrete as well as to concrete block, pipe, drain-tile, silo staves and other concrete products. More than fifty typical installations made during the past decade are illustrated.

Copies of "A Decade of Atlas Duraplastic" are available, on request, from Universal Atlas Cement Co., 723 Chrysler Building, New York 17, N. Y.

Hydraulic actuating cylinders

A 12-page catalog, Bulletin No. 500, has been issued by Ledeen Manufacturing Co., Los Angeles, manufacturers of pneumatic and hydraulic actuating cylinders. This bulletin gives dimensions and weights, ratings and limitations of the Medium Duty line of cylinders, as well as the same information for the Ledeen Heavy Duty and Super Duty lines. Information on the selection of cylinders is included, along with illustrations and designs of rod and head attachments.

For copies of Bulletin No. 500, write to Ledeen Manufacturing Co., 1600 S. San Pedro St., Los Angeles 15, Calif.

Concrete tester

A new concrete and cement testing machine of 300,000-lb capacity has been announced by the Baldwin Locomotive Works. Principal feature claimed of the new machine as compared with the previous design is that loading and weighing units are separate to prevent the transmission of load shocks to the indicators. The two-unit design also permits varying their relative positions to suit conditions of use and protects the operator from flying or falling particles of breaking specimens.

The new testing machine is a hydraulic compression-type suitable for standard concrete cylindrical test specimens 3 x 6 in., 6 x 12 in., and 8 x 16 in. Special bearing blocks are available for testing building blocks 12 in. wide and 18 in. long. These blocks may also be used for testing cylindrical specimens. Further information can be obtained from Baldwin Locomotive Works, Philadelphia 42, Pa.

Advanced study in transportation

Opportunities for advanced engineering students to undertake college study in transportation and traffic, particularly at the graduate level, are described in a booklet just published by the Institute of Transportation and Traffic Engineering at the University of California. The 24-page booklet describes the courses and curricula made available through the Institute at Berkeley and at Los Angeles, together with an outline of the Institute's research programs and facilities.

While courses are available in all phases of transportation, the Institute's major activities are at present concerned with highway engineering, highway traffic and airports. Interested students may obtain copies of the booklet on request to Prof. Harmer E. Davis, Director, Institute of Transportation and Traffic Engineering, University of California, Berkeley 4, Calif.

Power buggy

A new model of the Whiteman Power Buggy has been announced, for use in construction, manufacturing and maintenance operations. The manufacturer states that the dumping operation is made faster and easier by a new curved rack and pinion mechanism which improves leverage and gives the operator full control of the dump and return of the bucket when partial dumping is required. Speed of the Power Buggy has been increased from 12 to 16 mph and carrying capacity enlarged from 12 to 13 cu ft with a maximum load of 2000 lb. The new model can be used on light scaffolds or runways. Further information can be obtained from the Whiteman Manufacturing Co., 3249 Casitas Avenue, Los Angeles 39, Calif.

Masonry cutting

Clipper Mfg. Co. claims that a new factory-sealed water pump on the Model HD Clipper masonry saw eliminates the necessity of disconnecting the pump when cutting dry. To switch from wet to dry cutting the operator merely turns the pet cock on the outlet of the pump. The manufacturer claims that this new pump cannot be damaged by dry cutting—there is no need ever to remove the V-belts.

Illustrated and descriptive literature may be obtained from the Clipper Manufacturing Co., 2800 Warwick Trafficway, Kansas City 8, Mo.

Concrete cutter

The Felker Manufacturing Co. has announced a new Di-Met concrete cutter which, it is claimed, will handle all ordinary concrete cutting requirements. The Di-Met Standard Model uses a 12-in. diamond wheel on either the right or left side of the spindle, cutting to a depth of 3½ in. A 15 gal. tank supplies water to the blade when other sources are unavailable. Jets force the water stream against the blade sides to insure proper cleansing and cooling.

Further information can be obtained from Felker Manufacturing Co., Torrance, Calif.

Flow table

A new 10-in. diameter motor-driven flow table for testing the flow (consistency) of portland cement has been announced by the American Instrument Co., Inc. The complete apparatus consists essentially of the latest design of 10-in. diameter flow table, motor drive and bracket for mounting on a concrete pedestal. The motor drive and its mounting bracket may be purchased separately for attachment to manually-operated flow tables already in use provided that such tables meet the A.S.T.M. specifications.

The motor drive transmits motion to the shaft of the flow table by means of a multi-jaw coupling which compensates for minor misalignment in set-up and provides a positive, torsionless drive. The table shaft and cam revolve at 108 rpm, which results in 25 drops of the table in about 14 seconds.

Details are given in Bulletin No. 2177, American Instrument Co., Inc., Silver Spring, Md.

Crushing plant

Universal Engineering Corp. recently added to their TwinDual Series of portable plants.

The TwinDual "Gravel-King" claims three stages of crushing with scalping screen feed. A pre-screening operation sizes and removes natural sand and gravel. Large boulders usually rejected in gravel operations are scalped to the large opening primary. Material requiring secondary reduction is by-passed to the TwinDual roll crusher for the second and third stages of crushing. It is claimed 100 percent chips can be produced, or finished material from the scalping screen blended with crushed material from the plant.

A complete description is available in Bulletin No. U-501, Universal Engineering Corp., Cedar Rapids, Ia.

Split system of heating

A new folder released by the Flexicore Co., Inc., describes an unusual system for heating homes and apartments. The "Flexicore Split System of Warm-Air Panel Heating" booklet describes the method used to combine radiant panels with circulated warm air, and illustrates installations. The system features the use of Flexicore structural floor members as both warm air ducts and a panel heating unit.

Flexicore precast concrete floor and roof slabs are manufactured in 6 x 12 in. cross section. Warm air is introduced into two hollow cores 4⅝ in. in diameter cast the length of each slab to provide the warm air panel heating. The air then passes through holes in the top of the slabs into grills which circulate it through the room.

Copies of the booklet may be obtained from the Flexicore Co., Inc., P. O. Box 825, Dayton 1, Ohio.

Strainalyzer

The Baldwin Locomotive Works has announced a new instrument, the H-42 Strainalyzer, for the study and analysis of vibration strain and dynamic stresses. The makers claim that simultaneous observation and recording of electronic traces of four such functions in correct time relationships without the necessity of optical alignment are possible. Designed for use with Baldwin SR-4 strain gages, from 60 to 500 ohms, the instrument is composed of four units—the indicator, the indicator power supply, the camera and the camera speed control.

Bulletin 309 describing the Strainalyzer can be obtained from the Baldwin Locomotive Works, Testing Equipment Dept., Philadelphia 42, Pa.

Determination of SO_3

Smith-New York Co., Inc., have published a bulletin on the determination of SO_3 in nonmetallic minerals. The work is primarily of interest to the cement and gypsum industry, however, all laboratories that determine sulfate in the presence of sizeable quantities of calcium may find the method of interest.

The bulletin states that the titration method saves time compared with the traditional gravimetric method and offers the same accuracy. The method consists of extracting the sulfate from finely pulverized cement or stone by boiling with ammonium carbonate solution. The extract is separated from the stone by filtration and the extract boiled to remove excess ammonium carbonate; it is then titrated.

The bulletin is available from the Smith-New York Co., Inc., Freeport, Long Island, N. Y.

High tensile wire

A price list released recently by the Amerlux Steel Products Corp. lists types and prices of high tensile wire produced in their Belgium mills for use in prestressed concrete. Copies can be obtained from Amerlux Steel Products Corp., 551 Fifth Ave., New York 17, N. Y.

Two walls at the same time

A machine weighing less than 100 lb which builds two monolithic concrete walls at the same time has been offered as the solution to the problem of good housing at low cost. The machine was invented by Edwin Shuter, Canadian engineer, and used in England and Canada for several years; the first of these machines in the United States is now employed on a housing development in Florida.

The method of constructing the walls follows the principle of the pneumatic tire; between two walls, each 4 in. thick, there is a 2 in. air space. The 10 in. wall is sealed around doors, windows, foundation and roof to provide insulation against

condensation, vermin, heat, cold and sound stated the manufacturer. The walls are also fireproof, hurricaneproof and watertight.

A dry mix concrete consisting of one part cement, three parts sand, and three parts stone or shell, slightly moistened, is tamped into the Shuter system wall forming machines one section onto another. The result is a monolithic, clear cavity, self-insulated wall with no joints. Further information can be obtained from Duplex Walls, Inc., 10 North Wild Clive Ave., Daytona Beach, Fla.

Aluminum scaffolds

New aluminum alloy "Tube-and-Coupler" Scaffolds, have been announced by Up-Right Scaffolds. Designed for heavy construction work and industrial maintenance, the aluminum alloy scaffolds can be erected in any size or shape. The manufacturer claims that the light weight of the scaffolds permits faster erection and dismantling and that the scaffold has ½ greater strength than iron pipe tubing of similar diameter. Further information can be obtained from Up-Right Scaffolds, 1013 Pardee Street, Berkeley, Calif.

Anchoring machine bolts

Compounded anchors for anchoring machine bolts in masonry are described and illustrated in a catalog issued by the Star Expansion Bolt Co. Installation procedures are illustrated and technical and engineering data on the anchors are tabulated. Copies are available from Star Expansion Bolt Co., 137 Cedar Street, New York 6, N. Y.

Bulk transport

An illustrated 8-page leaflet has been released by Gramm Trailer Corp. describing their line of aerated trailers for hauling bulk materials such as cement, gypsum, lime, etc. The booklet describes unloading procedures using air pressure, which the manufacturer claims will unload up to 25 barrels per minute from the trailers. Copies may be obtained from Gramm Trailer Corp., Delphos, Ohio.

Functional designs

A leaflet issued by the Arthur Gales Co. describes a method of building a low cost home using "poured fill." The designer claims that the house is simple to build and can be erected by the average layman. The basic unit (essentially a form) to utilize "poured fill" can be erected in about 40 hours, and then becomes a part of the structure and eliminates extra formwork. Further information can be obtained from the Arthur Gales Co., Racine, Wis.

Waterproof enamel

Sapolin Paints Inc. has announced the development of a waterproof enamel for concrete, stucco and masonry surfaces that has a plastic rubber base. The manufacturer claims that the paint is resistant to the chemical action of lime and alkali. Further information is available through Sapolin Paints Inc., 229 E. 42nd Street, New York, N. Y.

Portable compressor

News Bulletin H-850-B71 published by Worthington Pump and Machinery Corp. illustrates and presents engineering data on their portable compressor for contractors. Copies are available from Worthington Pump and Machinery Corp., Construction Equipment Sales Division, Holyoke, Mass.

DISCUSSION

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Recommended Practice for the Application of Portland Cement Paint to Concrete Surfaces (ACI 616-49)—Report of Committee 616

An Ultrasonic Method of Studying Deterioration and Cracking in Concrete Structures—J. R. Leslie and W. J. Cheesman

Manufacture of Reinforced Foam Concrete Roof Slabs—I. T. Koudriashoff

Suggestions on Concrete Floor Construction—Ernst Gruenwald

Use of Air-Entraining Concrete in Canal Lining—Joseph J. Waddell

Discussion closed February 1, 1950

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The Use of Portland-Pozzolan Cement by the Bureau of Reclamation—Robert F. Blanks

Resistance of Concrete and Protective Coatings to Forces of Cavitation—Walter H. Price and George B. Wallace

Vacuum Processes Applied to Precast Concrete Houses—K. P. Billner and Bert M. Thorud

New Type of Consistency Meter Tested at Allatoona Dam—James M. Polatty

Effect of Mixing Sequence on the Properties of Concrete—F. L. Fitzpatrick and W. Serkin

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Bond of Concrete Reinforcing Bars—Arthur P. Clark

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Thin Wall Concrete Ship Construction—Francis R. Mac Leay

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Cement Performance in Concrete Exposed to Sulfate Soils—L. A. Dahl

Early Strength of Concrete as Affected by Steam Curing Temperatures—Joseph J. Shideler and Wilbur H. Chamberlin

A Shortcut for Determining Reinforcement in Reinforced Concrete—V. Bogvad-Christensen

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Precast Units for Short-Span Bridges—Robert C. Hanckel

Influence of Subgrades and Bases on Design of Rigid Pavements—Kenneth B. Woods

Inspection of Mass and Related Concrete Construction—Lewis H. Tuthill

Experimental Grouting Investigation for Chief Joseph Dam—J. M. Wells

Use of Pozzolans in Concrete—Raymond E. Davis

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Construction of Long-Span Concrete Arch Hangar at Limestone Air Force Base—John E. Allen

Volume Changes in Small Concrete Cylinders During Freezing and Thawing—Rudolph C. Valore, Jr.

Inspection and Control of Concrete for Highway and Bridge Construction—H. W. Russell

Some Applications of Electric SR-4 Gages in Reinforced Concrete Research—Eivind Hognestad and Ivan M. Viest

The Ultimate Strength of Reinforced Concrete Beams—S. D. Lash and J. W. Brison

Discussion closes July 1, 1950

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A Way to Better Pavement Concrete—F. H. Jackson

Design and Construction of a Circulating Water Intake—W. S. Colby

The Contractor's Viewpoint of Inspection—Donald C. Andrews and Nomer Gray

Corrosion Protection of Thin Precast Concrete Sections—D. H. Pletta, E. F. Massie and H. S. Robins

Design of Hexagonal Bins—Paul Rogers

Precast Concrete in Britain—P. G. Bowie and A. R. Collins

Discussion closes August 1, 1950

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The Zig-Zag Course of Concrete Progress—Herbert J. Gilkey

Concreting on the Ottawa River Projects of the Hydro-Electric Power Commission of Ontario—A. L. Malcolm and R. B. Young

Proposed Design Specification for Two-Way Floor Slabs—N. M. Newmark and C. P. Siess

Inspection of Building Construction—Leonard E. Dunlap

Australian Aggregates and Cements in Relation to Cement-Aggregate Reaction—A. R. Alderman, A. J. Gaskin, R. H. Jones and H. E. Vivian

Some Australian Studies on Cement-Aggregate Reaction in Mortar—H. E. Vivian

Carbon-Dioxide and the Cement-Aggregate Reaction—A. J. Gaskin

Spacing of Moment Bars in Precast Joists—F. N. Menefee and H. L. Kinnier

Proposed Specifications for Minimum Bar Spacing and Protective Cover in Precast Concrete Framing Members—Arsham Amirikian

The Problem of Slab Dimensions—Report of Subcommittee 2, Committee 325

Effect of Entrained Air on Bond Between Concrete and Reinforcing Steel—Eivind Hognestad and C. P. Siess

Discussion closes September 1, 1950

May Jl. '50

Report of ACI Committee 208 on Bond Stress—Report of Committee 208

New-Style Deformed Reinforcing Bars—Raymond C. Reese

Extent and Acceptability of Cracking in Precast Concrete Framing Members—Arsham Amirikian

Effect of Sustained Loading on Compressive Strength and Modulus of Elasticity of Concrete—George W. Washa and Paul G. Fluck

Fly Ash as a Pozzolan—Robert F. Blanks

The Inspector—Miles N. Clair

Patents and Codes Relating to Prestressed Concrete—Curzon Dobell

Precast Concrete Panel Multistory Construction—Thomas F. Gilbane

Tests of Precast Reinforced Concrete Joists—C. D. Williams and F. Bromilow

June Jl. '50

Cost of Long-Span Concrete Shell Roofs—Charles S. Whitney

Inspection of Ready-Mixed Concrete—E. L. Howard

Summary of Inspection Practice—R. B. Young and W. Schnarr

Design and Construction of Joints in Concrete Pavements—William Van Breemen, E. A. Finney and Thomas B. Pringle

Effects of High-Velocity Water on Bonneville Dam Concrete—R. R. Clark

Precast Reinforced Concrete Structures—C. D. Wailes, Jr.

Prestressed Concrete Construction Procedures—Thor Germundsson

SYNOPSES of recent ACI Papers and Reports

Institute papers of this JOURNAL Volume 21 are currently available at prices indicated. Please order by title and title number.

RECOMMENDED PRACTICE FOR THE APPLICATION OF PORTLAND CEMENT PAINT TO CONCRETE SURFACES (ACI 616-49) 46-1

Price 50 cents (in special covers).

REPORT OF COMMITTEE 616—Sept. 1949, pp. 1-16 (V. 46)

Supersedes 38-30 and 45-18.

This ACI standard establishes recommended practices for appropriate usage, age of concrete, preparation of surface, and the preparation, application and curing of portland cement paint. Three appendixes discuss composition, manufacture and storage, and general characteristics and factors affecting durability.

AN ULTRASONIC METHOD OF STUDYING DETERIORATION AND CRACKING IN CONCRETE STRUCTURES.....46-2

Price 35 cents.

J. R. LESLIE and W. J. CHEESMAN—Sept. 1949, pp. 17-36 (V. 46)

A new method and apparatus for field and laboratory testing of concrete is described. The apparatus called the "Soniscope" was originally designed to detect internal cracks in concrete. It develops pulses of ultrasonic sound in the material and measures the velocity of their transmission through it. This pulse velocity has the unique advantage of being independent of the size or shape of the body under test. Measurements can be made with equal facility in mass concrete, slabs or laboratory specimens.

The existence and extent of internal cracks and the depth of visible surface cracks can be determined by the use of this apparatus.

The velocity has been found, by experiment, to be a reliable measure of the condition of the concrete and is particularly useful in deterioration studies. The dynamic modulus can be calculated from this velocity, and values so obtained are found to agree closely with the results of tests using established methods.

MANUFACTURE OF REINFORCED FOAM CONCRETE ROOF SLABS ...46-3

Price 35 cents.

I. T. KOUDRIASHOFF—Sept. 1949, pp. 37-48 (V. 46)

The Russian type of lightweight concrete described used a rosin-glue emulsion to preserve the air voids before the initial set of the cement. Shrinkage was decreased and strength increased through high pressure steam curing. The autoclave treated foam-concrete used in the production of precast industrial roof slabs had a unit weight of 47 lb per cu ft and a compressive strength of over 500 psi. The lightweight slabs, used in a load carrying capacity and as insulation, reduced construction time by 50 percent and costs by as much as 20 percent. Test data on roof slabs and production procedures are also described.

SUGGESTIONS ON CONCRETE FLOOR CONSTRUCTION 46-4

Price 35 cents.

ERNST GRUENWALD—Sept. 1949, pp. 49-56 (V. 46)

The relationship between good concrete floors and the proper selection of cement and aggregates is discussed. Data are cited to emphasize the advantage of coarse-aggregate mixes over cement-sand topping for concrete floors.

USE OF AIR-ENTRAINING CONCRETE IN CANAL LINING 46-5

Price 35 cents.

JOSEPH J. WADDELL—Sept. 1949, pp. 57-64 (V. 46)

This paper presents a discussion based on field observations of the use of air entrainment in canal lining concrete. The Bureau of Reclamation made studies of air-entraining agents for use in the irrigation canal lining for the Friant-Kern Canal on the Bureau's Central Valley Project in California. Results to date indicate that appreciable benefits accrue when an air-entraining agent is used in concrete which is placed and compacted by means of a mechanical slip-form. Care is necessary in adjusting concrete mixes to incorporate entrained air because of the sensitivity to mix changes of concrete for slip-form placement.

THE USE OF PORTLAND-POZZOLAN CEMENT BY THE BUREAU OF RECLAMATION..46-6

Price 35 cents.

ROBERT F. BLANKS—Oct. 1949, pp. 89-108 (V. 46)

The Bureau of Reclamation has made extensive studies of pozzolanic materials, and portland-pozzolan cements are now being used in many of the major structures built by the Bureau. The properties of portland-pozzolan cement that are used advantageously in the production of mass concrete are described.

RESISTANCE OF CONCRETE AND PROTECTIVE COATINGS TO FORCES OF CAVITATION.....46-7

Price 35 cents.

WALTER H. PRICE and GEORGE B. WALLACE—Oct. 1949, pp. 109-120 (V. 46)

A machine used for producing cavitation erosion in the laboratory is described and the results of tests made to investigate the effect of mix proportions, surface treatment, and protective coatings on the resistance of concrete to cavitation are discussed. Through proper use of these, the resistance of concrete surfaces to cavitation erosion may be extended three or four times, but even the best concrete will not resist the forces of cavitation for a prolonged period. Heavy rubber coatings bonded well to the surface of the concrete have proved effective.

VACUUM PROCESSES APPLIED TO PRECAST CONCRETE HOUSES...46-8

Price 35 cents.

K. P. BILLNER and BERT M. THORUD—Oct. 1949, pp. 121-128 (V. 46)

The use of vacuum processes in precast concrete construction simplifies the building of fire-resistant, durable structures designed to permit the maximum use of like units. Vacuum processes have thus far been used in one- and two-story houses and one-story industrial or warehouse structures, but further developments should make possible similar benefits for multi-story construction.

The specific vacuum methods utilized are: (1) extracting excess water from freshly placed concrete prior to set, thereby increasing early strength and enabling early handling of units, (2) holding forms in place by vacuum and (3) handling and placing finished and hardened concrete units by cast-in-place closures formed and quickly hardened by vacuum processes.

The use of these methods results in high strength monolithic construction having exterior and interior finished surfaces, with insulation incorporated into the construction, if desired.

NEW TYPE OF CONSISTENCY METER TESTED AT ALLATOONA DAM....46-9

Price 35 cents.

JAMES M. POLATTY—Oct. 1949, pp. 129-136 (V. 46)

Various mechanical devices have been developed for indicating consistency of concrete since the early days of visual inspection after discharge from the mixer. A new type meter to measure the consistency of concrete while it is being mixed was tested at Allatoona Dam and the operation and results are described.

EFFECT OF MIXING SEQUENCE ON THE PROPERTIES OF CONCRETE....46-10

Price 35 cents.

F. L. FITZPATRICK and W. SERKIN—Oct. 1949, pp. 137-140 (V. 46)

The order in which the constituents of concrete (aggregates, cement and water) are combined in the mixing operation, has a significant effect upon the properties of the concrete as to workability, strength, density, surface finish and absorption. Tests are reported.

BOND OF CONCRETE REINFORCING BARS....46-11

Price 35 cents.

ARTHUR P. CLARK—Nov. 1949, pp. 161-184 (V. 46)

The tests reported were made to compare the resistance to slip in concrete (bond) of deformed bars when tested in beams and companion pull-out specimens, to secure information on the effects of size of bar, the type of deformations on the bars and the strength of concrete on the bond. The bars were cast in a horizontal position in all test specimens. The variables were depth of concrete under the bar, length of embedment of the bar in the concrete, strength of concrete and diameter of bar. Slip of the bar was measured at the loaded and free ends. Three tests were made with 2 in. of concrete under the bar, with 15 in. of concrete under the bar and with 3-in., 12-in., and 16-in. embedments.

Bond strengths for the beams and the pull-out specimens were affected similarly by changes in the geometry of the bars and the bond test specimens. They were greater when the bars were near the bottom than when they were near the top of the specimens. The highest bond strengths were obtained with bars having deformations conforming to suggested requirements for maximum spacing and minimum height and providing ratios of shearing to bearing areas less than 10, usually less than 6.

PERLITE AGGREGATE: ITS PROPERTIES AND USES....46-12

Price 35 cents.

J. JOHN BROUK—Nov. 1949, pp. 185-192 (V. 46)

Synthetic expanded volcanic rock, better known as perlite is a fairly recent addition to the lightweight aggregate field. Its use in concrete is governed by weight, gradation, mixing procedure, cellular structure, strength of cell walls, insulating properties, cost, etc. Air entrainment appears to be necessary to give a workable, nonsegregating mix. Perlite aggregate blended with sand can be used in high strength structural concrete and concrete products.

THIN WALL CONCRETE SHIP CONSTRUCTION....46-13

Price 35 cents.

FRANCIS R. MAC LEAY—Nov. 1949, pp. 193-204 V. 46)

The development of construction methods for placing thin concrete walls is described. After several attempts using the standard method of pouring between double forms, a new method was developed which permitted the successful construction of ¾-in. and 1½-in. concrete walls. Tests were also conducted to determine the practicability as well as the strength of Gunite as a medium to unite precast units into a monolithic ship. Later these methods were used successfully in the construction of a concrete landing craft for the United States Navy.

SPECIFICATIONS SHOULD BE REALISTIC....46-14

Price 35 cents.

HARRY F. THOMSON—Nov. 1949, pp. 205-220 (V. 46)

Specifications for concrete in moderate-sized and lesser construction frequently contain provisions which are ambiguous, conflicting in application, or do not fully recognize local materials. Most of these questionable features result from (1) inadequate information regarding the characteristics of concrete, or (2) use of ready-written specifications without revision for conditions or changes in standard requirements.

Among the features discussed are: specifying both method and result; "frozen" specifications; habitual use of "1-2-4", multiple provisions for quality; strength without naming consistency; recognition of local materials; use of compression tests; time of placing; bin-test of cement. Numerous quotations from specifications are given, and suggestions offered for bringing the provisions in line with actual conditions.

INSPECTION AND TESTING OF MATERIALS....46-15

Price 35 cents.

NICOLAAS T. F. STADTFELD—Dec. 1949, pp. 237-248 (V. 46)

This paper sets forth the care taken in the inspection and testing of 7 million barrels of portland cement used in 4 million cu yd of concrete of great uniformity and every indication of durability after 12 years of observation. It stresses for the concrete the importance of low water solubility, freedom from "laitance," lack of cement burns of the workers, low alkali content, and it shows above all the necessity for manufacturing control of the cement clinker. It describes how premature set of concrete was prevented. It also deals with the inspection, grading, and testing of aggregates. The Board of Water Supply specifications for aggregates are given as well as other factors used in securing good material.

FLEXURE OF CELLULAR SHELLS...46-16

Price 35 cents.

F. E. WOLOSEWICK—Dec. 1949, pp. 249-256 (V. 46

After a brief discussion of the uses of cellular shells and methods available for the solution of design problems, a sample problem is set up using the theorem of least work. From charts the moments are determined and the effect of added stiffeners is assessed.

CEMENT PERFORMANCE IN CONCRETE EXPOSED TO SULFATE SOILS....46-17

Price 35 cents.

L. A. DAHL—Dec. 1949, pp. 257-272 (V. 46)

The Long-Time Study of Cement Performance in Concrete deals with the performance of portland cements in concrete under various conditions of exposure in the field. Among these conditions is exposure to sulfate soils, that is, to the so-called "alkali soils." This part of the investigation is reported in Chapter 5, in which the complete data are given. The present paper describes briefly the work reported in Chapter 5 and the conclusions which have been drawn. Those readers who wish to study the results in greater detail are referred to the more complete report.

EARLY STRENGTH OF CONCRETE AS AFFECTED BY STEAM CURING TEMPERATURES....46-18

Price 35 cents.

JOSEPH J. SHIDELER and WILBUR H. CHAMBERLIN —Dec. 1949, pp. 273-284 (V. 46)

The testing and results obtained on 990 6 x 12-in. concrete cylinders steam cured for various periods and at temper-

atures ranging from 100 to 200 F are discussed. Strength results are given for ages ranging from 6 hours to 28 days and strengths of companion specimens moist cured at 70 F are given whenever possible. The information presented was obtained for the Bureau of Reclamation for writing specifications covering the steam curing of precast units such as irrigation pipe.

A SHORTCUT FOR DETERMINING REINFORCEMENT IN REINFORCED CONCRETE.....46-19

Price 35 cents.

V. BOGVAD-CHRISTENSEN—Dec. 1949, pp. 285-292 (V. 46)

This paper presents a graph which gives the complete relationship between moments, thrusts, concrete dimensions, reinforcement and resulting stresses for the reinforced concrete members in question.

PRECAST UNITS FOR SHORT-SPAN BRIDGES.....46-20

Price 35 cents.

ROBERT C. HANCKEL—Jan. 1950, pp. 317-328 (V. 46)

Bridge replacement in Lowell, Mass., where minimum traffic interruption was necessary, led to the adoption of precast reinforced concrete units. Available mobile hoisting equipment limited the maximum weight of sections to about 12 tons which permitted small bridges to be precast as complete structures, while for larger bridges, subassemblies were precast and incorporated into the bridge by a cast-in-place deck. The precasting procedures and construction processes are described and illustrated.

INFLUENCE OF SUBGRADES AND BASES ON DESIGN OF RIGID PAVEMENTS.....46-21

Price 35 cents.

KENNETH B. WOODS—Jan. 1950, pp. 329-348 (V. 46)

This paper has been developed from research data, published reports, and experiences gained by observing the performance of both rigid and flexible pavements—particularly as related to subgrade soil textures and the use of base courses. Structural failures of rigid pavements, caused by large concentrations of exceptionally heavy loads, indicate the need for an evaluation of subgrades and bases in determining the most economical design of rigid slabs.

Indications are that the structural capacity of rigid pavements can be improved by the use of location procedures which utilize the best in topographic position and subgrade soil textures. For inferior situations—in regard to position and soils—the use of base courses must be evaluated against the economy of using slabs of increased thickness, more reinforcing steel, or combinations of the two.

It is concluded that it is not entirely feasible, with the present state of knowledge, to standardize rigid pavement design. Rather, the available data indicate that design practices should be developed by regions in which the subgrade soil, availability and type of base course materials, climatic conditions, and traffic volumes and loads are evaluated.

INSPECTION OF MASS AND RELATED CONCRETE CONSTRUCTION.....46-22

Price 35 cents.

LEWIS H. TUTHILL—Jan. 1950, pp. 349-360 (V. 46)

This paper points out that inspection of any kind can be no more effective than that permitted by the specifications and, particularly, by the established job standard of inspection. No distinction is made between the usual activities of inspection and those associated with concrete control since both have the same objective: a serviceable and presentable structure. Details of requirements and procedure to this end are discussed.

EXPERIMENTAL GROUTING INVESTIGATION FOR CHIEF JOSEPH DAM.....46-23

Price 35 cents.

J. M. WELLS—Jan. 1950, pp. 361-376 (V. 46)

This paper describes the development of a method for the control of seepage into the excavation areas of the right abutment, and through the right abutment, at the Chief Joseph Dam project on the upper Columbia River in the State of Washington.

Laboratory studies are presented on various types of grout mixtures, as well as techniques and procedures for drilling in coarse gravel by jetting methods, procedure for grouting pervious gravels and the efficacy of grouting treatment.

USE OF POZZOLANS IN CONCRETE.....46-24

Price 35 cents.

RAYMOND E. DAVIS—Jan. 1950, pp. 377-384 (V. 46)

After stating the characteristics of pozzolonic materials, the effects of replacing with pozzolans part of the portland cement in concrete are considered briefly. Results of tests with fly ash and superfine diatomite are cited to show the possible use of these materials in the East and Midwest where natural pozzolans of the West are not economically available.

CONSTRUCTION OF LONG-SPAN CONCRETE ARCH HANGAR AT LIMESTONE AIR FORCE BASE.....46-25

Price 35 cents.

JOHN E. ALLEN—Feb. 1950, pp. 405-416 (V. 46)

The reinforced concrete arch hangar at Limestone Air Force Base is noteworthy for its size, being one of the largest of this type yet constructed in this country. The superstructure is composed of a thin reinforced arch shell, shaped like an inverted catenary. Construction procedures are described.

VOLUME CHANGES IN SMALL CONCRETE CYLINDERS DURING FREEZING AND THAWING.....46-26

Price 35 cents.

RUDOLPH C. VALORE, Jr.—Feb. 1950, pp. 417-436 (V. 46)

The volume-temperature behavior of small concrete cylinders was observed, using a new mercury-displacement dilatometer, during freezing and thawing cycles in which the range 40 to −20 F was traversed at various rates. Specimens cast from a mix containing 6 bags of portland cement per cu yd, plain and modified by the addition of an air-entraining agent, were tested in air-dry, vacuum-saturated and partially saturated conditions.

Volume-temperature relationships for air-dry specimens yielded uniform thermal expansion data, but those for vacuum-saturated specimens showed departures in the form of transient expansions during freezing, and residual expansions following thawing of the order of 0.8 and 0.4 percent, respectively, a single slow cycle produced decreases in dynamic E exceeding 60 percent.

Much smaller departures were observed for partially saturated specimens (65 to 85 percent of vacuum-saturation) and included, in addition to transient and residual expansions, secondary effects of freezing termed "shrinkage" and relaxation phenomena. The magnitude of the transient and residual expansions appeared to depend upon the rate of cooling and heating, the degree of saturation of the specimen, and, during the slow cycle, upon the degree of supercooling before freezing.

INSPECTION AND CONTROL OF CONCRETE FOR HIGHWAY AND BRIDGE CONSTRUCTION.....46-27

Price 35 cents.

H. W. RUSSELL—Feb. 1950, pp. 437-444 (V. 46)

Inspection procedures and personnel assignments used by the Illinois Division of Highways for large, medium and small jobs are described. The importance of assurance that materials used are adequately tested and approved before shipment, determination of proper proportions by trial mixtures, control of air entrainment, correction of batch weights and proper preparation and testing of concrete specimens are emphasized. The inspection of ready-mixed concrete supplied to small jobs poses a problem still lacking an adequate solution.

SOME APPLICATIONS OF ELECTRIC SR-4 GAGES IN REINFORCED CONCRETE RESEARCH.....46-28

Price 35 cents.

EIVIND HOGNESTAD and IVAN M. VIEST—Feb. 1950, pp. 445-456 (V. 46)

The writers describe some applications of SR-4 gages in reinforced concrete research at the University of Illinois. Special emphasis is given to the problems involved in waterproofing gages attached to steel which is later embedded in concrete.

THE ULTIMATE STRENGTH OF REINFORCED CONCRETE BEAMS...46-29

Price 35 cents.

S. D. LASH and J. W. BRISON—Feb. 1950, pp. 457-472 (V. 46)

The results of tests to failure on 57 small reinforced concrete beams are presented, and it is shown that they can be explained satisfactorily on the basis of a simple plastic theory of design. Formulas are proposed for determining the moments of resistance and the critical percentages of reinforcement.

A WAY TO BETTER PAVEMENT CONCRETE.....46-30

Price 35 cents.

F. H. JACKSON—Mar. 1950, pp. 489-496 (V. 46)

This paper discusses the performance requirements of concrete pavements from the standpoint, primarily, of the quality of the concrete as a material. It is pointed out that the lack of durability of much of our present day concrete may be due to our methods of construction. The writer believes pavement durability could be significantly improved by using a scientifically proportioned mix of dry consistency, well compacted by vibration or tamping, and with close control over aggregate gradation, in place of the oversanded plastic mixtures which we now use. He does not believe that air entrainment is necessarily the final answer to the problem of surface deterioration but that we should seriously consider overhauling our entire construction practice as well as our present methods of controlling the uniformity of aggregate gradations.

Current practice in the construction of concrete pavements and airport runways in Great Britain and past practice in Germany in the construction of the autobahnen are discussed to show that the placing of harsh, dry mixtures with close control of aggregate gradations is entirely feasible from the construction standpoint.

DESIGN AND CONSTRUCTION OF A CIRCULATING WATER INTAKE..46-31

Price 35 cents.

W. S. COLBY—Mar. 1950, pp. 497-508 (V. 46)

The author describes the design and construction of a 250,000 gpm power plant intake. An interesting feature of the pump well cofferdam was the reinforced concrete ring wales, which resulted in savings in operations because the interior of the cofferdam was kept clear for excavating, driving of drilled-in caissons, tremie operations and placing of the pump well concrete.

THE CONTRACTOR'S VIEWPOINT OF INSPECTION.....46-32

Price 35 cents.

DONALD C. ANDREWS and NOMER GRAY—Mar. 1950, pp. 509-512 (V. 46)

The interests of owner and contractor are compared and recommendations are made on specifications, personal qualifications of the inspector, and methods of minimizing friction with the contractor.

CORROSION PROTECTION OF THIN PRECAST CONCRETE SECTIONS.....46-33

Price 35 cents.

D. H. PLETTA, E. F. MASSIE and H. S. ROBINS—Mar. 1950, pp. 513-528 (V. 46)

A new electrical resistance technique for measuring the rate of corrosion of steel reinforcing is described. The method employs a thin ribbon 0.008 x 0.25 in. as the resistance element embedded in 6 x 12 in. thin panels, and a Kelvin bridge sensitive to 0.0001 ohm. The data plotted in dimensionless parameter form enable the *half-life* of concrete to be determined at a comparatively early age. The term half-life is defined as the time required for the cross-sectional area of the reinforcing to decrease by one-half its original value due to corrosion. Six mixes, three water-cement ratios, four exposure conditions and three depths of cover were examined.

DESIGN OF HEXAGONAL BINS...46-34

Price 35 cents.

PAUL ROGERS—Mar. 1950, pp. 529-540 (V. 46)

The analysis of hexagonal bins is presented with a practical example, showing the details of computations for lateral pressures, inward pull, hanging loads, diaphragm action and the design of the walls, beams and columns.

PRECAST CONCRETE IN BRITAIN..46-35

Price 35 cents.

P. G. BOWIE and A. R. COLLINS—Mar. 1950, pp. 541-556 (V. 46)

Precast frames for airplane hangars, garages and farm buildings are discussed. Several systems using precast units in housing construction are described and illustrated. Prestressed precast railroad ties and transmission-line poles are mentioned briefly.

THE ZIG-ZAG COURSE OF CONCRETE PROGRESS.....46-36

Price 35 cents.

HERBERT J. GILKEY—Apr. 1950, pp. 573-580 (V. 46)

Retiring ACI President Gilkey emphasizes that concrete has not become more complex, but rather that as knowledge advances, usually in a zig-zag course, not a straight line, more problems and seemingly contradictory half-truths become evident.

CONCRETING ON THE OTTAWA RIVER PROJECTS OF THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.....46-37

Price 35 cents.

A. L. MALCOLM and R. B. YOUNG—Apr. 1950, pp. 581-596 (V. 46)

Construction procedures on three Hydro-Electric Power Commission of Ontario dam projects are described includ-

ing the placing of concrete in lifts up to 50 ft, material and concrete handling systems, classes of concrete, sand blending and aggregate production, treatment of joints, concrete proportioning, winter concreting, and concrete control measures. A discussion of the merits of high lifts in mass concrete structures concludes the paper.

PROPOSED DESIGN SPECIFICATIONS FOR TWO-WAY FLOOR SLABS.....46-38

Price 35 cents.

N. M. NEWMARK and C. P. SIESS—Apr. 1950, pp. 597-608 (V. 46)

A new design specification for two-way concrete floor slabs is presented. It is proposed as a replacement for the methods currently contained in Section 709 of the ACI Building Code (ACI 318-47). This new specification is based on analyses of continuous rectangular slabs carrying a uniformly distributed load. Account is taken of the continuity of the slab, of the torsional stiffness of the beams, and of the deflection of the beams.

INSPECTION OF BUILDING CONSTRUCTION.....46-39

Price 35 cents.

LEONARD E. DUNLAP—Apr. 1950, pp. 609-612 (V. 46)

From the viewpoint of an architect, inspection on a job involving architectural and structural concrete encompasses a number of factors. Accurate plans and specifications, testing and developing the concrete mix design, proper erection of forms and placement of concrete, and systematic curing require close attention by a competent superintendent and qualified inspectors.

AUSTRALIAN AGGREGATES AND CEMENTS IN RELATION TO CEMENT-AGGREGATE REACTION 46-40

Price 35 cents.

A. R. ALDERMAN, A. J. GASKIN, R. H. JONES and H. E. VIVIAN—Apr. 1950, pp. 613-616 (V. 46)

A wide variety or Australian aggregates and cements has been examined with a view to estimating the possible incidence of expansive reaction in concrete made from these materials.

Mortar bars were observed over periods up to two years and the results correlated with petrographic examination of the aggregates and chemical composition of the cements. This correlation has shown that in most cases the potential reactivity can be assessed by petrographic examination but that doubtful material requires supplementary mortar tests.

SOME AUSTRALIAN STUDIES ON CEMENT-AGGREGATE REACTION IN MORTAR.....46-41

Price 35 cents.

H. E. VIVIAN—Apr. 1950, pp. 617-624 (V. 46)

This paper summarizes briefly some of the papers on cement-aggregate reaction which have been published by the Commonwealth Scientific and Industrial Research Organization in Australia. These papers deal with four aspects of mortar expansion; the change in mortar tensile strength as expansion occurs, the effects on mortar expansion of alkali mobility, of void space in the mortar and of different storage conditions.

CARBON DIOXIDE AND THE CEMENT-AGGREGATE REACTION 46-42

Price 35 cents.

A. J. GASKIN—Apr. 1950, pp. 625-628 (V. 46)

Spotting and expansion of cement mortars due to alkali-aggregate reaction can be prevented by treatment of the set mortar with carbon dioxide. Active alkali hydroxides, produced by hydrolysis of cement particles, are thereby converted to carbonates, which are inactive in contact with most aggregates. Sufficient "protective" calcium carbonate can be produced throughout the mortar to confer permanent immunity from spotting and expansion, but no appreciable improvement in tensile strength could be obtained. Carbonated mortars were found to have a high degree of dimensional stability.

SPACING OF MOMENT BARS IN PRECAST JOISTS.....46-43

Price 35 cents.

F. N. MENEFEE and H. L. KINNIER—Apr. 1950, pp. 629-636 (V. 46)

Spacing of moment bars in precast reinforced concrete joists in some cases has been as small as $\frac{1}{4}$ in. although it is probable that most manufacturers use $\frac{3}{4}$-in. shear or diagonal tension bars with corresponding spacing of moment bars.

ACI Building Code places a one in. minimum on spacing. Undoubtedly, the regulations were written with monolithic concrete rather than light precast joists in mind. Spacing has no particular significance if all the requirements for bond are met independently of it.

In a properly designed precast joist, theoretical computations show that bond stresses are always less in proportion to the maximum allowed than are any of the other stresses.

The tests herein reported were an attempt to determine whether the artificial reduction of bond area, up to 30 percent, had any effect on the over-all strength of the joist, and to give some indication as to whether $\frac{3}{8}$-in. spacing of moment bars introduced a controlling weakness. While test results on 14 joists, all of the same dimensions, could hardly produce conclusive evidence, the results, along with the service record of precast joists, indicate the $\frac{3}{4}$-in. spacing of moment bars, with $\frac{3}{4}$-in. maximum size aggregate and with all other requirements of the Building Code met, will give a joist which will fail otherwise than in bond, from which it appears that the present one in. minimum in the current Building Code should be thoroughly studied with a view toward modification for precast joists, with well anchored reinforcement—if opinion and tests justify such a change.

PROPOSED SPECIFICATIONS FOR MINIMUM BAR SPACING AND PROTECTIVE COVER IN PRECAST CONCRETE FRAMING MEMBERS...46-44

Price 35 cents.

ARSHAM AMIRIKIAN—Apr. 1950, pp. 637-640 (V.46)

The use of relatively small size aggregates and favorable conditions for quality control make it possible to place reinforcing bars in precast concrete work at closer spacings than those specified or required in conventionally poured-in-place concrete construction. Better quality control and utilization of rich mixtures make it also possible to obtain corrosion protection of reinforcing with relatively thin covers. Recommendations are given for a new basis of specifying bar spacing and cover, in the form of proposed specifications applicable to precast concrete work, together with a discussion of some of the considerations justifying the suggested specifications.

THE PROBLEM OF SLAB DIMENSIONS.....46-45

Price 35 cents.

REPORT OF SUBCOMMITTEE 2, COMMITTEE 325—Apr. 1950, pp. 641-648 (V. 46)

The dimensions of concrete pavement slabs necessary for optimum results depend on and are influenced by a great many factors, economic as well as physical. The factors and their relationship to slab dimensions discussed include strength, elastic and plastic properties, volume change, subgrades, construction conditions and slab thickness, length and width.

EFFECT OF ENTRAINED AIR ON BOND BETWEEN CONCRETE AND REINFORCING STEEL.....46-46

Price 35 cents.

EIVIND HOGNESTAD and C. P. SIESS—Apr. 1950, pp. 649-668 (V. 46)

This paper reports an experimental investigation of the effect of entrained air on the bond properties of the new Laclede and the Hi-Bond bars, each in ¾ in. and ⅞ in. sizes. Bond properties were studied through 108 pull-out tests with a constant bar embedment of 12 diameters. Bars were cast vertically as well as horizontally; in the latter case, with 6 and 30 bar diameters depth of concrete under the bars. A 5000 psi basic concrete mix was used, with air content as a major variable.

Within the scope of these tests it was found that up to the normal air content of 4 to 5 percent, the bond of all bars in all positions was reduced, in terms of percent, less than the flexural and compressive strength of the concrete. Where more than 5 percent air was entrained, however, the bond of the horizontal bars was reduced rapidly, probably due to rising air.

REPORT OF ACI COMMITTEE 208 ON BOND STRESS.....46-47

Price 35 cents.

REPORT OF COMMITTEE 208—May 1950, pp. 677-680 (V. 46)

A brief review of committee action on bond stresses in reinforced concrete with a tabulation of recommended values for various types of reinforcing bars.

NEW-STYLE DEFORMED REINFORCING BARS.....46-48

Price 35 cents.

RAYMOND C. REESE—May 1950, pp. 681-688 (V. 46)

The development of reinforcing bars from the original plain round or square forms to the present improved deformed patterns is traced through the early work of Withey and Abrams down to the 1949 report of Clark's tests. Noting that A.S.T.M. has adopted a standard for deformed bars, the author emphasizes the need for revision of design specifications to take into account the characteristics of the improved bars.

EXTENT AND ACCEPTABILITY OF CRACKING IN PRECAST CONCRETE FRAMING MEMBERS.....46-49

Price 35 cents.

ARSHAM AMIRIKIAN—May 1950, pp. 689-692 (V. 46)

One of the important questions arising in precast reinforced concrete construction concerns the acceptability of cracked framing members. Owing to the absence of definite guides for inspection, the fabricator often is penalized by unreasonable rejections. As an aid in this matter, a proposal is made for an acceptability clause which gives practical definitions of cracks and specifies limitations for acceptability.

EXTENT OF SUSTAINED LOADING ON COMPRESSIVE STRENGTH AND MODULUS OF ELASTICITY OF CONCRETE.....46-50

Price 35 cents.

GEORGE W. WASHA and PAUL G. FLUCK—May 1950, pp. 693-700 (V. 46)

This paper presents results which show the plastic flow characteristics of hand-rodded and vibrated concrete over a 10½-year period. Three different cements and three different water-cement ratios were included in the test program. The effect of the 10½-year loading period on the compressive strength and the modulus of elasticity is also shown.

FLY ASH AS A POZZOLAN.....46-51

Price 35 cents.

ROBERT F. BLANKS—May 1950, pp. 701-708 (V. 46)

Fly ash is being used in combination with portland cement in the concrete mix at Hungry Horse Dam because of the benefits derived from its use, including lower cost. The effects of the fly ash as a constituent in concrete on the workability, compressive strength, durability, permeability, heat of hydration, volume change, and counteraction of expansive reaction between aggregates and alkalies in cement are discussed briefly.

THE INSPECTOR.....46-52

Price 35 cents.

MILES N. CLAIR—May 1950, pp. 709-712 (V. 46)

The functions of the inspector include cooperation with the contractor in planning for good workmanship and progress, observation of construction operations and the recording of important facts relative to the work, and the enforcement of specifications and good construction practice. The qualifications for the inspector are discussed; he must be experienced, interested, be able to cooperate, be honest and have lots of common sense.

PATENTS AND CODES RELATING TO PRESTRESSED CONCRETE.....46-53

Price 35 cents.

CURZON DOBELL—May 1950, pp. 713-724 (V. 46)

Based on a study of more than 100 domestic and foreign patents and on correspondence with committees of engineers in England, Switzerland, France and Sweden this paper gives a brief account of the more important groups of patents, a synopsis of codes in preparation in the above countries and the problems to be overcome in drafting a prestressed code for domestic use.

PRECAST CONCRETE PANEL MULTISTORY CONSTRUCTION.....46-54

Price 35 cents.

THOMAS F. GILBANE—May 1950, pp. 725-732 (V. 46)

The construction procedure by which precast concrete panels were used in multistory buildings is described. Brief information is given on other structures where similar construction methods were utilized. Because of inherent economies, the author predicts wider use of precast concrete construction.

TESTS OF PRECAST REINFORCED CONCRETE JOISTS.....46-55

Price 35 cents.

C. D. WILLIAMS and F. BROMILOW—May 1950, pp. 733-748 (V. 46)

Tests made as part of the work of ACI Committee 711 to determine the effect of bar spacing on the strength of precast concrete joists are described. The method of quarter-point loading of commercial joists and the results of tests of bond specimens are briefly reviewed. It is concluded that the strength of the joists is controlled by the character of the weld used to fasten the stirrups to the main steel and that the test method used indicated no correlation between effective bond area of the steel and the load carrying capacity of the joists.

COST OF LONG-SPAN CONCRETE SHELL ROOFS.....46-56

Price 35 cents.

CHARLES S. WHITNEY—June 1950, pp. 765-776 (V. 46)

Reinforced concrete arched shell construction is compared with other types. It is pointed out that when the use of timber, structural steel or concrete is reasonably appropriate, assuming equal skill in design and the same design requirements, the first cost of buildings with long span roofs is ordinarily not greatly affected by the choice of material. This is especially true in the case of buildings in which the structural cost may amount to only about one-third of the total.

However, this is not necessarily true of the annual cost of the project because that is greatly modified by the length of life, and cost of maintenance, repairs, operation and insurance, which are different for the different materials. These latter cost items are difficult to estimate in advance, but, insofar as possible, cost comparisons should be made on an annual basis rather than initial cost.

INSPECTION OF READY-MIXED CONCRETE.....46-57

Price 35 cents.

E. L. HOWARD—June 1950, pp. 777-784 (V. 46)

The variety of mixes produced in a ready-mixed concrete plant complicate the work of the inspector in varying the mix design to suit the consumer's desires. Materials handling methods, changes in brands of cements and the means provided for measuring admixtures add to the difficulties. Aids to overcome these difficulties are discussed and a meter for measuring consistency of concrete is described.

SUMMARY OF INSPECTION PRACTICE.....46-58

Price 35 cents.

R. B. YOUNG and W. SCHNARR—June 1950, pp. 785-788 (V. 46)

The authors summarize the seven papers on inspection given at the 46th annual convention and published one a month in the ACI Journal from December, 1949 to June, 1950.

★DESIGN AND CONSTRUCTION OF JOINTS IN CONCRETE PAVEMENT SURFACES.....46-59

Price 60 cents.

WILLIAM VAN BREEMEN and E. A. FINNEY—June 1950, pp. 789-820 (V. 46)

With a supplement on

Structural Design of Joints for Airport Pavements

THOMAS B. PRINGLE

The basic fundamental conditions involved in the design and construction of joints are discussed. Various types of joints and load transfer devices are described, as well as various forms of structural failure of joints. Recommendations are given for the design, fabrication and installation of load-transfer devices, the construction and finishing of the concrete surrounding the joint assembly and the sealing of joints. A supplement discusses joints for heavy duty airport pavements.

EFFECTS OF HIGH-VELOCITY WATER ON BONNEVILLE DAM CONCRETE.....46-60

Price 35 cents

R. R. CLARK—June 1950, pp. 821-840 (V. 46)

The author compares the progressive erosion which has taken place in the stilling basin of Bonneville Dam with that anticipated in the design, together with the repairs that have been made and the effect on the repairs of the action of high-velocity water.

PRECAST REINFORCED CONCRETE STRUCTURES.....46-61

Price 35 cents.

C. D. WAILES, JR.—June 1950, pp. 841-856 (V. 46)

Several examples of the use of precast concrete in industrial, commercial and residential structures are described. Special design considerations, manufacturing methods, erection techniques and the inspection and testing of precast members are discussed.

PRESTRESSED CONCRETE CONSTRUCTION PROCEDURES.....46-62

Price 35 cents.

THOR GERMUNDSSON—June 1950, pp. 857-876 (V. 46)

In reviewing the construction procedures used in the production of prestressed concrete, the methods of prestressing are grouped under several simple classifications. A brief outline of these methods is presented, and typical prestressing procedures are described and illustrated.

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